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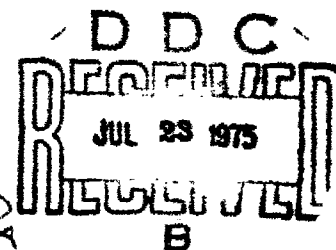
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**Tables of Asymptotic Directions and Vertical
Cutoff Rigidities for a Five Degree by Fifteen
Degree World Grid as Calculated Using the
International Geomagnetic Reference Field for
Epoch 1975.0**

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3 April 1975



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from interplanetary space, of a cosmic-ray particle. These asymptotic directions are given for each grid point for specific rigidities above the main cone cutoff rigidity. The table of vertical cutoff rigidities contains the geographic coordinates and L value of each location together with the main cone cutoff rigidity, the Störmer cutoff rigidity, and the effective cutoff rigidity.

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Preface

This is the fifth in a set of reports presenting, in tabular form, the results of utilizing high speed digital computers to calculate, by the trajectory-tracing method, the motion of charged particles in a mathematical simulation of the internal geomagnetic field. The principal results of these extensive calculations, which have been made over the past 15 years, have been the determination of the geomagnetic cutoff rigidity for specific locations on the earth and the determination of the asymptotic directions of the cosmic rays arriving at these locations from specific directions.

It is the intent of the authors to assemble these values in a group of reports so that they will be available to the scientific community both for analysis of scientific data and for comparison with other similar values that may become available by more sophisticated methods. The first four reports in this set presented various tables of asymptotic directions and cutoff rigidities for Epochs 1955 and 1960. This report contains tables of trajectory-derived asymptotic directions and vertical cutoff rigidities for a world grid as calculated employing a geomagnetic field model formed by the International Geomagnetic Reference Field coefficients with time derivatives appropriate for Epoch 1975.0.

Contents

1. INTRODUCTION	7
2. COSMIC-RAY ASYMPTOTIC DIRECTIONS	8
3. VERTICAL CUTOFF RIGIDITIES	14
REFERENCES	17
APPENDIX A: Table of Asymptotic Directions for the World Grid as Calculated Utilizing the International Geo- magnetic Reference Field for Epoch 1975.0	21
APPENDIX B: Table of Vertical Cutoff Rigidities for a World Grid Calculated Utilizing the International Geomagnetic Reference Field for Epoch 1975.0	155

Illustrations

1. Illustration of the Definition of the Asymptotic Direction of Approach	12
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Tables of Asymptotic Directions and Vertical Cutoff Rigidities for a Five Degree by Fifteen Degree World Grid as Calculated Using the International Geomagnetic Reference Field for Epoch 1975.0

1. INTRODUCTION

The knowledge of the asymptotic direction of a cosmic-ray particle and the cutoff rigidity of an observation point on the earth is often necessary and sometimes essential for a meaningful analysis of various problems in cosmic-ray physics. The asymptotic direction of a particle having a specific rigidity is the direction in interplanetary space from which the particle comes prior to its interaction with the earth's magnetic fields, and is a primary means of relating cosmic-ray intensity variations at the earth with the direction of these particles in interplanetary space.¹ The cutoff rigidity of a specific location on the earth is the rigidity below which cosmic rays are inaccessible to that location.^{2,3}

Since both the asymptotic directions and the cutoff rigidities are a function of geographic location, zenith and azimuthal angles, and the calculation of these values involves considerable computational time, it is impractical to determine

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1. McCracken, K. G. (1962) The cosmic-ray flare effect. 1. Some new methods of analysis, J. Geophys. Res. 67:423.
2. Störmer, C. (1930) Periodische Elektronenbahnen im Felde eines Elementarmagneten und ihre Anwendung auf Brückes Modellversuche und auf Eschenhagens Elementarwellen des Erdmagnetismus, Z. Astrophys. 1:237-274.
3. Rossi, B. (1940) System of units for nuclear and cosmic-ray phenomena, Phys. Rev. 57:660.

the values for an infinite number of locations and directions on the earth. During the past 15 years the use of high speed digital computers has allowed a limited number of these calculations to be made, with most of these calculations being made for specific analyses and for specific cosmic-ray stations.⁴⁻⁹

We have been using the trajectory-tracing technique to compute the asymptotic directions of cosmic-ray particles and cutoff rigidities for several years. Many of these values have been published in various tables,⁷⁻¹² while the remaining and majority of values have been utilized primarily in various analyses.¹³⁻²⁰ Throughout this work we have maintained a composite listing of all locations for which we have made these calculations. The purpose of this set of publications is to present, in tabular form, listings of asymptotic directions and cutoff rigidities calculated using the trajectory-tracing method. The first four publications in this set²¹⁻²⁴ contained the results of the extensive cutoff rigidity calculations made using the Finch and Leaton²⁵ (Epoch 1955.0) internal geomagnetic field model, as well as a smaller set of results obtained using the Jensen and Cain²⁶ (Epoch 1-60.0) field coefficients. This report contains the asymptotic directions, in condensed form, for a world grid with grid points 5 degrees in latitude and 15 degrees in longitude as calculated utilizing the International Geomagnetic Reference Field²⁷ (IGRF) with time derivatives applied so that the coefficients for the field model are appropriate for a 1975.0 Epoch. These asymptotic directions are given in Appendix A, with a summary of the vertical cutoff rigidities for each of the world grid locations given in Appendix B.

2. COSMIC-RAY ASYMPTOTIC DIRECTIONS

In the various studies of cosmic radiation, it is often necessary to know the direction of particle motion in the interplanetary magnetic field near the earth in order to relate the intensity observations at a specific location, azimuth, and zenith angle on the earth to an interplanetary flux. With this purpose in mind, the concept of asymptotic directions of approach has been developed over the years by researchers such as Malmfors,²⁸ Brunberg,^{29,30} Brunberg and Dattner,³¹ and McCracken.¹ The asymptotic direction of approach defines the direction of a velocity vector in geocentric coordinates such that the direction of this vector is parallel to a radial from the earth's center. Accurate numerical calculations of the asymptotic directions of approach have long been advocated,^{28,32,33} however, the earlier work was limited to dipolar field models because of the complexity

Due to the large number of references in the above text, refer to the list of references at the end of this report for specific information on references 4 thru 33.

of the problem.^{30,34,35} The advent of high-speed digital computers made it possible to construct relatively accurate mathematical models of the geomagnetic field and to integrate the equation of charged particle motion in these magnetic field models. The standard method for representing the magnetic field is to define a magnetic potential function U in terms of a spherical harmonic expansion. In spherical coordinates this function is:

$$U(r, \theta, \phi) = a \sum_{n=0}^{\infty} \sum_{m=0}^n (g_n^m \cos m\phi + h_n^m \sin m\phi) P_n^m(\cos \theta) \left(\frac{a}{r}\right)^{n+1}$$

where g_n^m and h_n^m are the Gauss coefficients, $P_n^m(\cos \theta)$ are the partially normalized Legendre functions, and a is the average radius of the earth. This method is described adequately by Chapman and Bartels³⁶ and is the method commonly used for constructing models of the geomagnetic field. The magnetic field vector, \vec{B} , may be computed at any point where the potential function is valid by obtaining the derivatives of the potential function:

$$B_r = - \frac{\partial U(r, \theta, \phi)}{\partial r}$$

$$B_\theta = - \frac{1}{r} \frac{\partial U(r, \theta, \phi)}{\partial \theta}$$

$$B_\phi = - \frac{1}{r \sin \theta} \frac{\partial U(r, \theta, \phi)}{\partial \phi}$$

The equation for charged particle motion in a magnetic field, in vector form, is

$$\vec{R} = \frac{e}{mc} \vec{R} \times \vec{B}.$$

In spherical coordinates this equation expands to the following differential equations:

34. Jory, F.S. (1956) Selected cosmic-ray orbits in the earth's magnetic field. Phys. Rev. 103:1068.

35. Lust, R. (1957) Impact zones for solar cosmic-ray particles. Phys. Rev. 105: 1827.

36. Chapman, S., and Bartels, J. (1951) Geomagnetism Vol. 2, Oxford Univ. Press, London.

$$\frac{dv_r}{dt} = \frac{e}{mc} (v_\theta B_\phi - v_\phi B_\theta) = \frac{v_\theta^2}{r} - \frac{v_\phi^2}{r}$$

$$\frac{dv_\theta}{dt} = \frac{e}{mc} (v_\phi B_r - v_r B_\phi) = \frac{v_r v_\theta}{r} + \frac{v_\theta^2}{r \tan \theta}$$

$$\frac{dv_\phi}{dt} = \frac{e}{mc} (v_r B_\theta - v_\theta B_r) = \frac{v_r v_\phi}{r} - \frac{v_\theta v_\phi}{r \tan \theta}$$

where,

$$\frac{dr}{dt} = v_r$$

$$\frac{d\theta}{dt} = \frac{v_\theta}{r}$$

$$\frac{d\phi}{dt} = \frac{v_\phi}{r \sin \theta}$$

In these equations we use the following notation:

\vec{R}	position vector of a cosmic-ray particle
r	radial distance from the center of the earth
θ	co-latitude
ϕ	longitude measured eastward from the Greenwich meridian
v	magnitude of particle velocity
v_r, v_θ, v_ϕ	velocity components in r , θ , and ϕ directions
c	velocity of light
m	inertial mass of cosmic-ray particle, $m = m_0 \left(1 - \frac{v^2}{c^2}\right)^{-\frac{1}{2}}$, where m_0 is the rest mass
\vec{B}	vector magnetic induction in Gauss
e	cosmic-ray charge in esu.

Since the general equation of particle motion in a magnetic field does not have a solution in closed form, it is necessary to employ numerical methods to determine the trajectory of a charged particle in the geomagnetic field. With the advent of high-speed digital computers, it became possible to obtain an

accurate solution to this problem for a specified field model, rigidity, and initial conditions. In practice the Gill³⁷ modification of the Runge-Kutta iteration method, as adapted by McCracken,^{1,38} became the standard method of tracing cosmic-ray trajectories through the geomagnetic field. In this process, a knowledge of the position and velocity coordinates of one point on the trajectory is used, in conjunction with the differential equations, to give the coordinates of a subsequent point on the trajectory. Repeated application gives sufficient points to describe the trajectory precisely.

In the trajectory-tracing process we utilize the fact that the orbit of a negatively charged particle moving outward from the earth from a specific location and direction is identical to the orbit of a positive particle of equal rigidity approaching the earth, and ultimately arriving at the same location in the same direction. Formulas and methods that use the differential equation of motion to determine the path of a charged particle in the geomagnetic field by using the numerical integration technique have been published several times and will not be repeated here.^{1,3,38-40}

In practice we wish to integrate the trajectory utilizing the minimum number of calculations. This involves a compromise between choosing the largest step size to minimize computer time and the necessity of using a small step size in the Runge-Kutta process to keep the error within acceptable limits. For these calculations of the 1975 world grid, we replaced the library of step sizes provided in the original McCracken program³⁸ with a computed step size that is between 1/25 and 1/50 of the distance traveled during one gyration. In a uniform field the time required for one gyration is

$$\frac{33.33}{B} P \left(\frac{2\pi}{3c} \right),$$

37. Gill, S. (1951) A process for the step-by-step integration of differential equations in an automatic digital computing machine. Proc. Cambridge Phil. Soc. 47:96.
38. McCracken, K.G., Rao, U.R., and Shea, M.A. (1962) The trajectories of cosmic rays in a high degree simulation of the geomagnetic field. M.I.T. Tech. Rept No. 77, NYO-2670.
39. Shea, M.A., Smart, D.F., and McCracken, K.G. (1965) A study of vertically incident cosmic-ray trajectories using sixth-degree simulations of the geomagnetic field. AFCRL Environmental Research Papers No. 141, AFCRL-65-705.
40. Shea, M.A., Smart, D.F., McCracken, K.G., and Rao, U.R. (1968) Supplement to IQSY Instruction Manual No. 10, cosmic ray tables - asymptotic directions, variational coefficients and cutoff rigidities, AFCRL Spec. Reports No. 71, AFCRL-68-0030.

where P is in units of GV, c is in units of km/sec, and β is the ratio between the particle velocity and the speed of light. If the distance traveled during a gyration is divided into 50 steps, then the step size, H , in units of time, is approximately

$$\frac{1.4 \cdot 10^{-5} P}{\beta \beta} \text{ seconds.}$$

Since the earth's magnetic field is not uniform, we recomputed the step length for each Runge Kutta iteration step. At each step the velocity of the particle was checked, and if the current value of β differed from the initial value by more than $1 \cdot 10^{-5}$, the integration was declared unacceptable and the trajectory recomputed with the previous step size, H , divided in half.

In the original work,³⁸ before the existence of the interplanetary magnetic field was verified, the orbit of a charged particle was traced through the geomagnetic field to a distance sufficiently far from the earth (selected as 25 earth radii by McCracken) that the effects of the geomagnetic field on the orbit became essentially insignificant. At this point the direction of motion of the particle was calculated in terms of the geocentric coordinate system as illustrated in Figure 1. The "asymptotic latitude", Λ , is given by

$$\tan \Lambda = \frac{-v_{\theta} \sin \theta + v_r \cos \theta}{\left[v_{\theta}^2 + (v_{\theta} \cos \theta + v_r \sin \theta)^2 \right]^{1/2}}$$

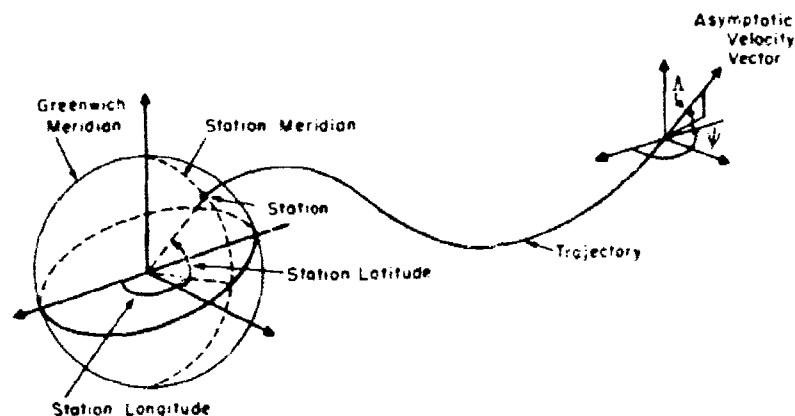


Figure 1. Illustration of the Definition of the Asymptotic Direction of Approach

and the "asymptotic longitude", λ , by

$$\lambda - \theta = \arctan \left(\frac{v_\theta}{v_\theta \cos \theta + v_r \sin \theta} \right).$$

In light of the current knowledge of the magnetosphere and the magnetospheric tail, the original definition of the asymptotic direction of approach has been somewhat modified to mean the direction (in geocentric coordinates) of the velocity vector of the cosmic ray when it penetrates the magnetopause or at some arbitrary distance down the magnetospheric tail. For cosmic-ray trajectories with rigidities far above the cutoff rigidity, the computed asymptotic directions of approach at the position of the magnetopause obtained using a magnetospheric field model and those calculated using only an internal field are very similar. For cosmic-ray trajectories having rigidities 2 to 3 GV above the cutoff rigidity (or ~ 5 GV for the very high polar latitudes), significant differences occur between the asymptotic directions computed using only internal fields and those computed using magnetospheric models containing both the magnetic fields of internal origin and those due to currents on the magnetopause and the magnetospheric tail.⁴¹ Near the cosmic-ray cutoff rigidity, the asymptotic directions of approach of cosmic rays with rigidities of only a few GV computed with an internal field, have relatively little correspondence to those calculated using magnetospheric models.

The asymptotic directions contained in Appendix A of this report are intended as a reference standard for Epoch 1975.0. These calculations were made using the International Geomagnetic Reference Field²⁷ model of the quiescent internal geomagnetic field with the time derivatives applied such that the coefficients were appropriate for describing the geomagnetic field for Epoch 1975.0. The calculations were initiated at 20 km above the surface of an oblate earth where the radius of the earth $r_{\text{(initial)}}$ is given by

$$r_{\text{(initial)}} = \left\{ \frac{1}{a} b \left[1 - \epsilon^2 \cos^2 \lambda \right]^{-1/2} + 20.0 \right\}.$$

In this equation b is the minimum (polar) radius of the earth (6356.9 km), ϵ is the eccentricity ($\epsilon^2 = 6.725 \times 10^{-3}$) and a is the average radius of the earth (6371.2 km). Calculations were continued to a distance of 25 earth radii, at which time the asymptotic directions of approach were computed. For a number of cosmic-ray

41. Gall, Ruth, Jiménez, J., and Orozco, A. (1969) Directions of approach of cosmic rays for high latitude stations, J. Geophys. Res., 74:3529.

studies these asymptotic directions are quite useful in ascertaining the amount of geomagnetic bending cosmic rays undergo before arriving at a specific location on the earth. These tables are limited to the vertical direction with 20 GV as the highest rigidity contained. Except for locations near the equator, higher rigidities have asymptotic directions for vertically incident particles that approach the vector radial.

In our research utilizing asymptotic directions of approach for cosmic-ray studies, we find that the asymptotic directions of vertically incident particles are a reasonable approximation to the entire asymptotic cone of acceptance except for rigidities ≥ 10 GV above the cosmic-ray cutoff rigidity of a specific location. At rigidities where the gyro radius of the particle is small compared to the radius of the earth, the trajectories of all other azimuths and zeniths angles are similar to the vertical trajectory with a phase angle displacement which accounts for the initial pitch angle. This is sometimes referred to as the focusing effect of the geomagnetic field.

The asymptotic directions of approach presented in Appendix A are at standardized intervals of 1 GV from a magnetic rigidity of either 10 or 20 GV (dependent upon location) down to near the main cone cutoff rigidity. Approximately 0.5 GV above the main cone cutoff rigidity, the geomagnetic bending is more extensive and asymptotic directions are given in 0.1 GV intervals. Very near the main cone cutoff rigidity, asymptotic directions are given at 0.01 GV intervals. This report does not include the asymptotic directions of the allowed trajectories in the penumbra; however, the results of the trajectory calculations at 0.01 GV intervals through the penumbra, including the asymptotic directions for the allowed rigidities, are contained on magnetic tape available through the World Data Centers.

3. VERTICAL CUTOFF RIGIDITIES

Cosmic ray cutoff rigidities are obtained by determining the "fate" (whether an individual rigidity has a trajectory accessible from infinity or is forbidden) of cosmic-ray trajectories over the entire rigidity spectrum. Starting at a rigidity high above the highest possible cutoff, cosmic-ray trajectories are calculated at discrete intervals, decreasing in rigidity until we are satisfied that the cutoff has been reached. As the calculations progress down through the rigidity spectrum, the results change from the easily allowed orbits to a complex structure of allowed, forbidden, and quasi-trapped orbits (loosely called penumbra), and finally to a set of rigidities where the trajectories all intersect the solid earth. As a result of these type of trajectory calculations, we can define three

distinct rigidities: the main cone cutoff, $P(M)$, above which all rigidities are allowed, the Störmer cutoff, $P(S)$, below which all rigidities are forbidden, and an effective cutoff rigidity, PC , which we have defined as

$$PC = P(M) - \left[\int_{P(S)}^{P(M)} dP \right]_{\text{allowed}},$$

thus allowing for the opacity of the penumbra. A detailed definition of these effective cutoffs has been published,⁸ and the effect of different spectral slopes and coupling functions has been investigated by Dorman et al.⁴² In the penumbral region of allowed and forbidden orbits, calculations were made at discrete 0.01 GV intervals in an effort to define the structure within this region.

There is an inherent hazard in using the trajectory-tracing method to determine the structure within the penumbra in that some of the allowed rigidities may not be found due to a systematic limitation resulting from performing the trajectory calculations at discrete intervals. In our work we have made the specific assumption that if a trajectory is accessible (or forbidden) at a rigidity P_i , then this result is applicable over the intervals between $P_i \pm \Delta P/2$ where ΔP is the size of the rigidity interval. However, we recognize that the penumbra consists of a very complex structure of allowed and forbidden bands, and this structure is most certainly finer than the 0.01 GV intervals employed. Consequently, calculations down the rigidity spectrum at finite discrete intervals might miss some of the allowed rigidities for a specific location and direction.

It is difficult to be assured that the lowest possible rigidity which may be allowed for a given location in a specific direction (that is, the Störmer cutoff value) has been precisely determined. We have found that for complex penumbra, extending the calculations to lower rigidities at smaller rigidity intervals, often results in an additional allowed rigidity considerably below the previous last allowed rigidity. This problem and the degree of confidence to which we feel we have located the lowest possible allowed rigidity is discussed in detail by Shea and Smart.⁴³

42. Dorman, L.I., Gushchina, R.T., Shea, M.A., and Smart, D.F. (1972) Cosmic Rays Effective Cutoff Rigidities, Publishing House "Nauka", Moscow, USSR.

43. Shea, M.A., and Smart, D.F. (1974) Tables of asymptotic directions, cut-off rigidities, and reentrant albedo calculations for Palestine, Dallas, and Midland, Texas, AFCRL Special Reports No. 175, AFCRL-TR-74-0159.

The effect of the currents in the magnetosphere and the magnetospheric tail were not considered in these calculations. The work of Gall et al.,⁴⁴ Smart et al.,⁴⁵ and Smart and Shea⁴⁶ have shown that the inclusion of these currents and the magnetospheric tail results in a significant lowering of the cutoff values at locations for which the internal field vertical cutoff rigidity would be ≤ 0.5 GV, and therefore, care should be taken when using these tables for these locations. The effects of these external sources would result in slight decreases (~ 0.1 GV) for locations where the vertical cutoff rigidity calculated with the internal geomagnetic field model is between 0.5 and 2.0 GV. Little if any effect is found for locations where the vertical cutoff rigidity is higher than 2.0 GV.⁴⁷

Vertical cutoff rigidities for each of the world grid locations are given in Appendix I. Each grid point is identified by the geographic coordinates, together with the L value calculated using the same field model utilized in the trajectory-tracing program (that is, the IGRF²⁷ model). All L values were calculated for an altitude of 20 km, consistent with the initializing of the trajectory-tracing technique. The various cutoff rigidity data for each location are in order of main cone cutoff rigidity, P(M), the Störmer cutoff rigidity, P(S), the width of the penumbra, and the effective cutoff rigidity, P_C.^{*} All rigidities are in GV.

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* The abbreviations for the main cone cutoff rigidity, the Störmer cutoff rigidity, and the effective cutoff rigidity in this paper have been changed slightly to permit computerized headings in the tables. Earlier work used the abbreviations P_m, P_S, and P_C for the main cone, Störmer, and effective cutoff rigidities respectively.

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Appendix A

Table of Asymptotic Directions for the World Grid as Calculated Utilizing the International Geomagnetic Reference Field for Epoch 1975.0

Table A1 lists the asymptotic directions for world grid locations with grid points each 5 degrees in latitude and 15 degrees in longitude. The listings are arranged by latitude with six longitudes to a page, starting with the northern polar regions and decreasing in latitude to the southern polar regions.

The geographic coordinates are given across the top of each page with the appropriate rigidity and asymptotic directions given underneath the coordinates. Each listing continues with decreasing rigidity values until the first forbidden orbit is reached. These forbidden orbits are designated by either an "R" or an "F", representing reentrant or failed-to-reach-a-solution respectively. The rigidities are in GV, and the asymptotic directions given in geocentric coordinates to the nearest degree with positive latitude in the northern hemisphere, negative latitude in the southern hemisphere, and longitudes measured east from the Greenwich meridian. Negative asymptotic longitudes indicate that the grid point is in the Western Hemisphere and the cosmic-ray trajectory did not cross the Greenwich meridian during its orbit from the interplanetary medium to its detection point. Asymptotic longitudes greater than 360° are indicative of the number of times the cosmic-ray particle crossed the Greenwich meridian during its trajectory as it circumscribed the earth.

TABLE A1
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 80.00 LONG. = 0.00	GEOGRAPHIC LAT. = 80.00 LONG. = 15.00	GEOGRAPHIC LAT. = 80.00 LONG. = 30.00	GEOGRAPHIC LAT. = 80.00 LONG. = 45.00	GEOGRAPHIC LAT. = 80.00 LONG. = 60.00	GEOGRAPHIC LAT. = 80.00 LONG. = 75.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
10.00 69 42	10.00 68 56	10.00 68 69	10.00 65 82	10.00 65 96	10.00 64 109
9.00 68 64	9.00 67 78	9.00 66 71	9.00 65 64	9.00 64 97	9.00 63 110
8.00 68 47	8.00 67 60	8.00 66 53	8.00 64 86	8.00 63 94	8.00 61 111
7.00 68 30	7.00 66 43	7.00 65 75	7.00 62 87	7.00 61 99	7.00 59 112
6.00 68 13	6.00 66 26	6.00 65 58	6.00 59 86	6.00 58 98	6.00 57 113
5.00 68 00	5.00 66 13	5.00 65 45	5.00 58 85	5.00 57 98	5.00 56 118
4.00 67 52	4.00 66 04	4.00 65 36	4.00 58 68	4.00 56 100	4.00 55 112
3.00 67 44	3.00 65 57	3.00 65 28	3.00 53 88	3.00 51 108	3.00 50 112
2.00 67 36	2.00 65 49	2.00 65 20	2.00 46 90	2.00 45 101	2.00 44 113
1.00 67 28	1.00 65 41	1.00 65 12	1.00 46 89	1.00 44 101	1.00 43 113
0.00 67 20	0.00 65 33	0.00 65 04	0.00 45 90	0.00 44 101	0.00 43 113
-1.00 67 12	-1.00 65 25	-1.00 64 55	-1.00 45 91	-1.00 44 102	-1.00 43 114
-2.00 67 04	-2.00 65 17	-2.00 64 47	-1.00 45 91	-1.00 44 102	-1.00 43 114
-3.00 66 56	-3.00 65 09	-3.00 64 39	-1.00 45 91	-1.00 44 102	-1.00 43 114
-4.00 66 48	-4.00 65 01	-4.00 64 31	-1.00 45 91	-1.00 44 102	-1.00 43 114
-5.00 66 40	-5.00 64 53	-5.00 64 23	-1.00 45 91	-1.00 44 102	-1.00 43 114
-6.00 66 32	-6.00 64 45	-6.00 64 15	-1.00 45 91	-1.00 44 102	-1.00 43 114
-7.00 66 24	-7.00 64 37	-7.00 64 07	-1.00 45 91	-1.00 44 102	-1.00 43 114
-8.00 66 16	-8.00 64 29	-8.00 63 59	-1.00 45 91	-1.00 44 102	-1.00 43 114
-9.00 66 08	-9.00 64 21	-9.00 63 51	-1.00 45 91	-1.00 44 102	-1.00 43 114
-10.00 66 00	-10.00 64 13	-10.00 63 43	-1.00 45 91	-1.00 44 102	-1.00 43 114
-11.00 65 52	-11.00 64 05	-11.00 63 35	-1.00 45 91	-1.00 44 102	-1.00 43 114
-12.00 65 44	-12.00 63 57	-12.00 63 27	-1.00 45 91	-1.00 44 102	-1.00 43 114
-13.00 65 36	-13.00 63 49	-13.00 63 19	-1.00 45 91	-1.00 44 102	-1.00 43 114
-14.00 65 28	-14.00 63 41	-14.00 63 11	-1.00 45 91	-1.00 44 102	-1.00 43 114
-15.00 65 20	-15.00 63 33	-15.00 63 03	-1.00 45 91	-1.00 44 102	-1.00 43 114
-16.00 65 12	-16.00 63 25	-16.00 62 55	-1.00 45 91	-1.00 44 102	-1.00 43 114
-17.00 65 04	-17.00 63 17	-17.00 62 47	-1.00 45 91	-1.00 44 102	-1.00 43 114
-18.00 64 56	-18.00 63 09	-18.00 62 39	-1.00 45 91	-1.00 44 102	-1.00 43 114
-19.00 64 48	-19.00 63 01	-19.00 62 31	-1.00 45 91	-1.00 44 102	-1.00 43 114
-20.00 64 40	-20.00 62 53	-20.00 62 23	-1.00 45 91	-1.00 44 102	-1.00 43 114
-21.00 64 32	-21.00 62 45	-21.00 62 15	-1.00 45 91	-1.00 44 102	-1.00 43 114
-22.00 64 24	-22.00 62 37	-22.00 62 07	-1.00 45 91	-1.00 44 102	-1.00 43 114
-23.00 64 16	-23.00 62 29	-23.00 61 99	-1.00 45 91	-1.00 44 102	-1.00 43 114
-24.00 64 08	-24.00 62 21	-24.00 61 91	-1.00 45 91	-1.00 44 102	-1.00 43 114
-25.00 64 00	-25.00 62 13	-25.00 61 83	-1.00 45 91	-1.00 44 102	-1.00 43 114
-26.00 63 52	-26.00 62 05	-26.00 61 75	-1.00 45 91	-1.00 44 102	-1.00 43 114
-27.00 63 44	-27.00 61 57	-27.00 61 67	-1.00 45 91	-1.00 44 102	-1.00 43 114
-28.00 63 36	-28.00 61 49	-28.00 61 59	-1.00 45 91	-1.00 44 102	-1.00 43 114
-29.00 63 28	-29.00 61 41	-29.00 61 51	-1.00 45 91	-1.00 44 102	-1.00 43 114
-30.00 63 20	-30.00 61 33	-30.00 61 43	-1.00 45 91	-1.00 44 102	-1.00 43 114
-31.00 63 12	-31.00 61 25	-31.00 61 35	-1.00 45 91	-1.00 44 102	-1.00 43 114
-32.00 63 04	-32.00 61 17	-32.00 61 27	-1.00 45 91	-1.00 44 102	-1.00 43 114
-33.00 62 56	-33.00 61 09	-33.00 61 19	-1.00 45 91	-1.00 44 102	-1.00 43 114
-34.00 62 48	-34.00 61 01	-34.00 61 11	-1.00 45 91	-1.00 44 102	-1.00 43 114
-35.00 62 40	-35.00 60 53	-35.00 61 03	-1.00 45 91	-1.00 44 102	-1.00 43 114
-36.00 62 32	-36.00 60 45	-36.00 60 55	-1.00 45 91	-1.00 44 102	-1.00 43 114
-37.00 62 24	-37.00 60 37	-37.00 60 47	-1.00 45 91	-1.00 44 102	-1.00 43 114
-38.00 62 16	-38.00 60 29	-38.00 60 39	-1.00 45 91	-1.00 44 102	-1.00 43 114
-39.00 62 08	-39.00 60 21	-39.00 60 31	-1.00 45 91	-1.00 44 102	-1.00 43 114
-40.00 62 00	-40.00 60 13	-40.00 60 23	-1.00 45 91	-1.00 44 102	-1.00 43 114
-41.00 61 52	-41.00 60 05	-41.00 60 15	-1.00 45 91	-1.00 44 102	-1.00 43 114
-42.00 61 44	-42.00 59 57	-42.00 60 07	-1.00 45 91	-1.00 44 102	-1.00 43 114
-43.00 61 36	-43.00 59 49	-43.00 59 59	-1.00 45 91	-1.00 44 102	-1.00 43 114
-44.00 61 28	-44.00 59 41	-44.00 59 51	-1.00 45 91	-1.00 44 102	-1.00 43 114
-45.00 61 20	-45.00 59 33	-45.00 59 43	-1.00 45 91	-1.00 44 102	-1.00 43 114
-46.00 61 12	-46.00 59 25	-46.00 59 35	-1.00 45 91	-1.00 44 102	-1.00 43 114
-47.00 61 04	-47.00 59 17	-47.00 59 27	-1.00 45 91	-1.00 44 102	-1.00 43 114
-48.00 60 56	-48.00 59 09	-48.00 59 19	-1.00 45 91	-1.00 44 102	-1.00 43 114
-49.00 60 48	-49.00 59 01	-49.00 59 11	-1.00 45 91	-1.00 44 102	-1.00 43 114
-50.00 60 40	-50.00 58 53	-50.00 59 03	-1.00 45 91	-1.00 44 102	-1.00 43 114
-51.00 60 32	-51.00 58 45	-51.00 58 55	-1.00 45 91	-1.00 44 102	-1.00 43 114
-52.00 60 24	-52.00 58 37	-52.00 58 47	-1.00 45 91	-1.00 44 102	-1.00 43 114
-53.00 60 16	-53.00 58 29	-53.00 58 39	-1.00 45 91	-1.00 44 102	-1.00 43 114
-54.00 60 08	-54.00 58 21	-54.00 58 31	-1.00 45 91	-1.00 44 102	-1.00 43 114
-55.00 60 00	-55.00 58 13	-55.00 58 23	-1.00 45 91	-1.00 44 102	-1.00 43 114
-56.00 59 52	-56.00 58 05	-56.00 58 15	-1.00 45 91	-1.00 44 102	-1.00 43 114
-57.00 59 44	-57.00 57 57	-57.00 58 07	-1.00 45 91	-1.00 44 102	-1.00 43 114
-58.00 59 36	-58.00 57 49	-58.00 57 59	-1.00 45 91	-1.00 44 102	-1.00 43 114
-59.00 59 28	-59.00 57 41	-59.00 57 51	-1.00 45 91	-1.00 44 102	-1.00 43 114
-60.00 59 20	-60.00 57 33	-60.00 57 43	-1.00 45 91	-1.00 44 102	-1.00 43 114
-61.00 59 12	-61.00 57 25	-61.00 57 35	-1.00 45 91	-1.00 44 102	-1.00 43 114
-62.00 59 04	-62.00 57 17	-62.00 57 27	-1.00 45 91	-1.00 44 102	-1.00 43 114
-63.00 58 56	-63.00 57 09	-63.00 57 19	-1.00 45 91	-1.00 44 102	-1.00 43 114
-64.00 58 48	-64.00 57 01	-64.00 57 11	-1.00 45 91	-1.00 44 102	-1.00 43 114
-65.00 58 40	-65.00 56 53	-65.00 57 03	-1.00 45 91	-1.00 44 102	-1.00 43 114
-66.00 58 32	-66.00 56 45	-66.00 56 55	-1.00 45 91	-1.00 44 102	-1.00 43 114
-67.00 58 24	-67.00 56 37	-67.00 56 47	-1.00 45 91	-1.00 44 102	-1.00 43 114
-68.00 58 16	-68.00 56 29	-68.00 56 39	-1.00 45 91	-1.00 44 102	-1.00 43 114
-69.00 58 08	-69.00 56 21	-69.00 56 31	-1.00 45 91	-1.00 44 102	-1.00 43 114
-70.00 58 00	-70.00 56 13	-70.00 56 23	-1.00 45 91	-1.00 44 102	-1.00 43 114
-71.00 57 52	-71.00 56 05	-71.00 56 15	-1.00 45 91	-1.00 44 102	-1.00 43 114
-72.00 57 44	-72.00 55 57	-72.00 56 07	-1.00 45 91	-1.00 44 102	-1.00 43 114
-73.00 57 36	-73.00 55 49	-73.00 55 59	-1.00 45 91	-1.00 44 102	-1.00 43 114
-74.00 57 28	-74.00 55 41	-74.00 55 51	-1.00 45 91	-1.00 44 102	-1.00 43 114
-75.00 57 20	-75.00 55 33	-75.00 55 43	-1.00 45 91	-1.00 44 102	-1.00 43 114
-76.00 57 12	-76.00 55 25	-76.00 55 35	-1.00 45 91	-1.00 44 102	-1.00 43 114
-77.00 57 04	-77.00 55 17	-77.00 55 27	-1.00 45 91	-1.00 44 102	-1.00 43 114
-78.00 56 56	-78.00 55 09	-78.00 55 19	-1.00 45 91	-1.00 44 102	-1.00 43 114
-79.00 56 48	-79.00 55 01	-79.00 55 11	-1.00 45 91	-1.00 44 102	-1.00 43 114
-80.00 56 40	-80.00 54 53	-80.00 55 03	-1.00 45 91	-1.00 44 102	-1.00 43 114
-81.00 56 32	-81.00 54 45	-81.00 54 55	-1.00 45 91	-1.00 44 102	-1.00 43 114
-82.00 56 24	-82.00 54 37	-82.00 54 47	-1.00 45 91	-1.00 44 102	-1.00 43 114
-83.00 56 16	-83.00 54 29	-83.00 54 39	-1.00 45 91	-1.00 44 102	-1.00 43 114
-84.00 56 08	-84.00 54 21	-84.00 54 31	-1.00 45 91	-1.00 44 102	-1.00 43 114
-85.00 56 00	-85.00 54 13	-85.00 54 23	-1.00 45 91	-1.00 44 102	-1.00 43 114
-86.00 55 52	-86.00 54 05	-86.00 54 15	-1.00 45 91	-1.00 44 102	-1.00 43 114
-87.00 55 44	-87.00 53 57	-87.00 54 07	-1.00 45 91	-1.00 44 102	-1.00 43 114
-88.00 55 36	-88.00 53 49	-88.00 53 59	-1.00 45 91	-1.00 44 102	-1.00 43 114
-89.00 55 28	-89.00 53 41	-89.00 53 51	-1.00 45 91	-1.00 44 102	-1.00 43 114
-90.00 55 20	-90.00 53 33	-90.00 53 43	-1.00 45 91	-1.00 44 102	-1.00 43 114
-91.00 55 12	-91.00 53 25	-91.00 53 35	-1.00 45 91	-1.00 44 102	-1.00 43 114
-92.00 55 04	-92.00 53 17	-92.00 53 27	-1.00 45 91	-1.00 44 102	-1.00 43 114
-93.00 54 56	-93.00 53 09	-93.00 53 19	-1.00 45 91	-1.00 44 102	-1.00 43 114
-94.00 54 48	-94.00 53 01	-94.00 53 11	-1.00 45 91	-1.00 44 102	-1.00 43 114
-95.00 54 40	-95.00 52 53	-95.00 53 03	-1.00 45 91	-1.00 44 102	-1.00 43 114
-96.00 54 32	-96.00 52 45	-96.00 52 55	-1.00 45 91	-1.00 44 102	-1.00 43 114
-97.00 54 24	-97.00 52 37	-97.00 52 47	-1.00 45 91	-1.00 44 102	-1.00 43 114
-98.00 54 16	-98.00 52 29	-98.00 52 39	-1.00 45 91	-1.00 44 102	-1.00 43 114
-99.00 54 08	-99.00 52 21	-99.00 52 31	-1.00 45 91	-1.00 44 102	-1.00 43 114
-100.00 54 00	-100.00 52 13	-100.00 52 23	-1.00 45 91	-1.00 44 102	-1.00 43 114

TABLE F-11 (CONTINUED)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			
LAT.	LONG.	TIME	LAT.	LONG.	TIME	LAT.	LONG.	TIME	LAT.	LONG.	TIME	LAT.	LONG.	TIME	LAT.	LONG.	TIME	LAT.	LONG.	TIME	
10.00	63 123	10.00	61 136	10.00	60 147	10.00	59 150	10.00	59 150	10.00	59 150	10.00	59 150	10.00	59 150	10.00	59 150	10.00	59 150	10.00	59 150
9.00	62 123	9.00	61 136	9.00	60 147	9.00	59 150	9.00	59 150	9.00	59 150	9.00	59 150	9.00	59 150	9.00	59 150	9.00	59 150	9.00	59 150
8.00	63 124	8.00	62 136	8.00	61 147	8.00	60 150	8.00	60 150	8.00	60 150	8.00	60 150	8.00	60 150	8.00	60 150	8.00	60 150	8.00	60 150
7.00	64 124	7.00	63 136	7.00	62 147	7.00	61 150	7.00	61 150	7.00	61 150	7.00	61 150	7.00	61 150	7.00	61 150	7.00	61 150	7.00	61 150
6.00	65 124	6.00	64 136	6.00	63 147	6.00	62 150	6.00	62 150	6.00	62 150	6.00	62 150	6.00	62 150	6.00	62 150	6.00	62 150	6.00	62 150
5.00	66 124	5.00	65 136	5.00	64 147	5.00	63 150	5.00	63 150	5.00	63 150	5.00	63 150	5.00	63 150	5.00	63 150	5.00	63 150	5.00	63 150
4.00	67 124	4.00	66 136	4.00	65 147	4.00	64 150	4.00	64 150	4.00	64 150	4.00	64 150	4.00	64 150	4.00	64 150	4.00	64 150	4.00	64 150
3.00	68 124	3.00	67 136	3.00	66 147	3.00	65 150	3.00	65 150	3.00	65 150	3.00	65 150	3.00	65 150	3.00	65 150	3.00	65 150	3.00	65 150
2.00	69 124	2.00	68 136	2.00	67 147	2.00	66 150	2.00	66 150	2.00	66 150	2.00	66 150	2.00	66 150	2.00	66 150	2.00	66 150	2.00	66 150
1.00	70 124	1.00	69 136	1.00	68 147	1.00	67 150	1.00	67 150	1.00	67 150	1.00	67 150	1.00	67 150	1.00	67 150	1.00	67 150	1.00	67 150
0.00	71 124	0.00	70 136	0.00	69 147	0.00	68 150	0.00	68 150	0.00	68 150	0.00	68 150	0.00	68 150	0.00	68 150	0.00	68 150	0.00	68 150
1.00	72 124	1.00	71 136	1.00	70 147	1.00	69 150	1.00	69 150	1.00	69 150	1.00	69 150	1.00	69 150	1.00	69 150	1.00	69 150	1.00	69 150
2.00	73 124	2.00	72 136	2.00	71 147	2.00	70 150	2.00	70 150	2.00	70 150	2.00	70 150	2.00	70 150	2.00	70 150	2.00	70 150	2.00	70 150
3.00	74 124	3.00	73 136	3.00	72 147	3.00	71 150	3.00	71 150	3.00	71 150	3.00	71 150	3.00	71 150	3.00	71 150	3.00	71 150	3.00	71 150
4.00	75 124	4.00	74 136	4.00	73 147	4.00	72 150	4.00	72 150	4.00	72 150	4.00	72 150	4.00	72 150	4.00	72 150	4.00	72 150	4.00	72 150
5.00	76 124	5.00	75 136	5.00	74 147	5.00	7														

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC (GV) LAT. = 80.00 LONG. = 180.00	GEOGRAPHIC (GV) LAT. = 80.00 LONG. = 195.00	GEOGRAPHIC (GV) LAT. = 80.00 LONG. = 210.00	GEOGRAPHIC (GV) LAT. = 80.00 LONG. = 225.00	GEOGRAPHIC (GV) LAT. = 80.00 LONG. = 240.00	GEOGRAPHIC (GV) LAT. = 80.00 LONG. = 255.00
10.00 60 187	13.00 67 -163	10.00 65 -153	10.00 60 -141	10.00 72 -137	10.00 75 -129
9.00 60 187	13.00 67 -163	9.00 65 -153	9.00 60 -141	9.00 72 -137	9.00 75 -129
8.00 59 189	13.00 61 -163	8.00 64 -153	8.00 59 -141	8.00 71 -137	8.00 74 -131
7.00 59 189	13.00 60 -162	7.00 63 -153	7.00 58 -141	7.00 70 -137	7.00 73 -125
6.00 55 188	13.00 54 -163	6.00 61 -154	6.00 55 -141	6.00 69 -137	6.00 72 -125
5.00 54 186	13.00 50 -166	5.00 60 -156	5.00 54 -145	5.00 65 -132	5.00 73 -114
4.00 52 184	13.00 55 -165	4.00 58 -156	4.00 61 -146	4.00 68 -131	4.00 73 -116
3.00 49 184	13.00 52 -167	3.00 56 -158	3.00 61 -148	3.00 67 -131	3.00 72 -117
2.00 43 184	13.00 46 -168	2.00 52 -160	2.00 58 -150	2.00 64 -131	2.00 71 -120
1.00 42 183	13.00 44 -169	1.00 51 -160	1.00 57 -150	1.00 64 -131	1.00 71 -120
1.00 41 183	13.00 43 -169	1.00 50 -160	1.00 56 -151	1.00 63 -131	1.00 70 -121
1.00 39 183	13.00 44 -169	1.00 49 -161	1.00 56 -151	1.00 63 -131	1.00 70 -121
1.00 39 183	13.00 43 -169	1.00 49 -161	1.00 56 -151	1.00 63 -131	1.00 70 -121
1.00 37 183	13.00 42 -165	1.00 48 -161	1.00 55 -151	1.00 62 -131	1.00 70 -121
1.00 36 182	13.00 41 -170	1.00 47 -162	1.00 54 -152	1.00 61 -131	1.00 69 -121
1.00 35 183	13.00 40 -170	1.00 46 -162	1.00 53 -153	1.00 61 -131	1.00 69 -121
1.00 34 183	13.00 39 -170	1.00 45 -162	1.00 52 -153	1.00 60 -131	1.00 69 -121
1.00 32 182	13.00 37 -170	1.00 44 -162	1.00 51 -154	1.00 60 -131	1.00 69 -121
1.00 30 182	13.00 36 -171	1.00 43 -163	1.00 50 -154	1.00 59 -131	1.00 68 -121
1.00 28 182	13.00 35 -171	1.00 42 -164	1.00 49 -155	1.00 58 -131	1.00 67 -121
1.00 25 182	13.00 32 -171	1.00 39 -164	1.00 47 -156	1.00 57 -131	1.00 66 -121
1.00 22 182	13.00 29 -171	1.00 36 -164	1.00 44 -157	1.00 54 -131	1.00 63 -121
1.00 18 182	13.00 26 -171	1.00 33 -163	1.00 41 -157	1.00 51 -131	1.00 60 -121
1.00 13 183	13.00 21 -172	1.00 31 -166	1.00 39 -160	1.00 49 -131	1.00 58 -121
1.00 5 184	13.00 15 -172	1.00 26 -166	1.00 34 -162	1.00 43 -131	1.00 53 -121
1.00 -7 188	13.00 5 -171	1.00 19 -168	1.00 25 -166	1.00 36 -131	1.00 46 -121
1.00 -19 188	13.00 -16 -167	1.00 10 -170	1.00 16 -167	1.00 26 -131	1.00 36 -121
1.00 -31 190	13.00 -20 -165	1.00 3 -171	1.00 9 -167	1.00 19 -131	1.00 29 -121
1.00 -43 192	13.00 -23 -162	1.00 0 -170	1.00 22 -167	1.00 12 -131	1.00 22 -121
1.00 -55 193	13.00 -26 -160	1.00 -3 -171	1.00 19 -170	1.00 9 -131	1.00 19 -121
1.00 -67 195	13.00 -29 -157	1.00 -6 -171	1.00 16 -171	1.00 6 -131	1.00 16 -121
1.00 -79 196	13.00 -32 -154	1.00 -9 -172	1.00 13 -172	1.00 3 -131	1.00 13 -121
1.00 -91 198	13.00 -35 -151	1.00 -12 -172	1.00 10 -172	1.00 0 -131	1.00 10 -121
1.00 -103 200	13.00 -38 -148	1.00 -15 -173	1.00 7 -173	1.00 -3 -131	1.00 7 -121
1.00 -115 202	13.00 -41 -145	1.00 -18 -173	1.00 4 -173	1.00 -6 -131	1.00 4 -121
1.00 -127 204	13.00 -44 -142	1.00 -21 -173	1.00 1 -173	1.00 -9 -131	1.00 1 -121
1.00 -139 206	13.00 -47 -139	1.00 -24 -173	1.00 -2 -173	1.00 -12 -131	1.00 -2 -121
1.00 -151 208	13.00 -50 -136	1.00 -27 -173	1.00 -5 -173	1.00 -15 -131	1.00 -5 -121
1.00 -163 210	13.00 -53 -133	1.00 -30 -173	1.00 -8 -173	1.00 -18 -131	1.00 -8 -121
1.00 -175 212	13.00 -56 -130	1.00 -33 -173	1.00 -11 -173	1.00 -21 -131	1.00 -11 -121
1.00 -187 214	13.00 -59 -127	1.00 -36 -173	1.00 -14 -173	1.00 -24 -131	1.00 -14 -121
1.00 -200 216	13.00 -62 -124	1.00 -39 -173	1.00 -17 -173	1.00 -27 -131	1.00 -17 -121
1.00 -212 218	13.00 -65 -121	1.00 -42 -173	1.00 -20 -173	1.00 -30 -131	1.00 -20 -121
1.00 -225 220	13.00 -68 -118	1.00 -45 -173	1.00 -23 -173	1.00 -33 -131	1.00 -23 -121
1.00 -237 222	13.00 -71 -115	1.00 -48 -173	1.00 -26 -173	1.00 -36 -131	1.00 -26 -121
1.00 -250 224	13.00 -74 -112	1.00 -51 -173	1.00 -29 -173	1.00 -39 -131	1.00 -29 -121
1.00 -262 226	13.00 -77 -109	1.00 -54 -173	1.00 -32 -173	1.00 -42 -131	1.00 -32 -121
1.00 -275 228	13.00 -80 -106	1.00 -57 -173	1.00 -35 -173	1.00 -45 -131	1.00 -35 -121
1.00 -287 230	13.00 -83 -103	1.00 -60 -173	1.00 -38 -173	1.00 -48 -131	1.00 -38 -121
1.00 -300 232	13.00 -86 -100	1.00 -63 -173	1.00 -41 -173	1.00 -51 -131	1.00 -41 -121
1.00 -312 234	13.00 -89 -97	1.00 -66 -173	1.00 -44 -173	1.00 -54 -131	1.00 -44 -121
1.00 -325 236	13.00 -92 -94	1.00 -69 -173	1.00 -47 -173	1.00 -57 -131	1.00 -47 -121
1.00 -337 238	13.00 -95 -91	1.00 -72 -173	1.00 -50 -173	1.00 -60 -131	1.00 -50 -121
1.00 -350 240	13.00 -98 -88	1.00 -75 -173	1.00 -53 -173	1.00 -63 -131	1.00 -53 -121
1.00 -362 242	13.00 -101 -85	1.00 -78 -173	1.00 -56 -173	1.00 -66 -131	1.00 -56 -121
1.00 -375 244	13.00 -104 -82	1.00 -81 -173	1.00 -59 -173	1.00 -69 -131	1.00 -59 -121
1.00 -387 246	13.00 -107 -79	1.00 -84 -173	1.00 -62 -173	1.00 -72 -131	1.00 -62 -121
1.00 -400 248	13.00 -110 -76	1.00 -87 -173	1.00 -65 -173	1.00 -75 -131	1.00 -65 -121
1.00 -412 250	13.00 -113 -73	1.00 -90 -173	1.00 -68 -173	1.00 -78 -131	1.00 -68 -121
1.00 -425 252	13.00 -116 -70	1.00 -93 -173	1.00 -71 -173	1.00 -81 -131	1.00 -71 -121
1.00 -437 254	13.00 -119 -67	1.00 -96 -173	1.00 -74 -173	1.00 -84 -131	1.00 -74 -121
1.00 -450 256	13.00 -122 -64	1.00 -99 -173	1.00 -77 -173	1.00 -87 -131	1.00 -77 -121
1.00 -462 258	13.00 -125 -61	1.00 -102 -173	1.00 -80 -173	1.00 -90 -131	1.00 -80 -121
1.00 -475 260	13.00 -128 -58	1.00 -105 -173	1.00 -83 -173	1.00 -93 -131	1.00 -83 -121
1.00 -487 262	13.00 -131 -55	1.00 -108 -173	1.00 -86 -173	1.00 -96 -131	1.00 -86 -121
1.00 -500 264	13.00 -134 -52	1.00 -111 -173	1.00 -89 -173	1.00 -99 -131	1.00 -89 -121
1.00 -512 266	13.00 -137 -49	1.00 -114 -173	1.00 -92 -173	1.00 -102 -131	1.00 -92 -121
1.00 -525 268	13.00 -140 -46	1.00 -117 -173	1.00 -95 -173	1.00 -105 -131	1.00 -95 -121
1.00 -537 270	13.00 -143 -43	1.00 -120 -173	1.00 -98 -173	1.00 -108 -131	1.00 -98 -121
1.00 -550 272	13.00 -146 -40	1.00 -123 -173	1.00 -101 -173	1.00 -111 -131	1.00 -101 -121
1.00 -562 274	13.00 -149 -37	1.00 -126 -173	1.00 -104 -173	1.00 -114 -131	1.00 -104 -121
1.00 -575 276	13.00 -152 -34	1.00 -129 -173	1.00 -107 -173	1.00 -117 -131	1.00 -107 -121
1.00 -587 278	13.00 -155 -31	1.00 -132 -173	1.00 -110 -173	1.00 -120 -131	1.00 -110 -121
1.00 -600 280	13.00 -158 -28	1.00 -135 -173	1.00 -113 -173	1.00 -123 -131	1.00 -113 -121
1.00 -612 282	13.00 -161 -25	1.00 -138 -173	1.00 -116 -173	1.00 -126 -131	1.00 -116 -121
1.00 -625 284	13.00 -164 -22	1.00 -141 -173	1.00 -119 -173	1.00 -129 -131	1.00 -119 -121
1.00 -637 286	13.00 -167 -19	1.00 -144 -173	1.00 -122 -173	1.00 -132 -131	1.00 -122 -121
1.00 -650 288	13.00 -170 -16	1.00 -147 -173	1.00 -125 -173	1.00 -135 -131	1.00 -125 -121
1.00 -662 290	13.00 -173 -13	1.00 -150 -173	1.00 -128 -173	1.00 -138 -131	1.00 -128 -121
1.00 -675 292	13.00 -176 -10	1.00 -153 -173	1.00 -131 -173	1.00 -141 -131	1.00 -131 -121
1.00 -687 294	13.00 -179 -7	1.00 -156 -173	1.00 -134 -173	1.00 -144 -131	1.00 -134 -121
1.00 -700 296	13.00 -182 -4	1.00 -159 -173	1.00 -137 -173	1.00 -147 -131	1.00 -137 -121
1.00 -712 298	13.00 -185 -1	1.00 -162 -173	1.00 -140 -173	1.00 -150 -131	1.00 -140 -121
1.00 -725 300	13.00 -188 2	1.00 -165 -173	1.00 -143 -173	1.00 -153 -131	1.00 -143 -121
1.00 -737 302	13.00 -191 5	1.00 -168 -173	1.00 -146 -173	1.00 -156 -131	1.00 -146 -121
1.00 -750 304	13.00 -194 8	1.00 -171 -173	1.00 -149 -173	1.00 -159 -131	1.00 -149 -121
1.00 -762 306	13.00 -197 11	1.00 -174 -173	1.00 -152 -173	1.00 -162 -131	1.00 -152 -121
1.00 -775 308	13.00 -200 14	1.00 -177 -173	1.00 -155 -173	1.00 -165 -131	1.00 -155 -121
1.00 -787 310	13.00 -203 17	1.00 -180 -173	1.00 -158 -173	1.00 -168 -131	1.00 -158 -121
1.00 -800 312	13.00 -206 20	1.00 -183 -173	1.00 -161 -173	1.00 -171 -131	1.00 -161 -121
1.00 -812 314	13.00 -209 23	1.00 -186 -173	1.00 -164 -173	1.00 -174 -131	1.00 -164 -121
1.00 -825 316	13.00 -212 26	1.00 -189 -173	1.00 -167 -173	1.00 -177 -131	1.00 -167 -121
1.00 -837 318	13.00 -215 29	1.00 -192 -173	1.00 -170 -173	1.00 -180 -131	1.00 -170 -121
1.00 -850 320	13.00 -218 32	1.00 -195 -173	1.00 -173 -173	1.00 -183 -131	1.00 -173 -121
1.00 -862 322	13.00 -221 35	1.00 -198 -173	1.00 -176 -173	1.00 -186 -131	1.00 -176 -121
1.00 -875 324	13.00 -224 38	1.00 -201 -173	1.00 -179 -173	1.00 -189 -131	1.00 -179 -121
1.00 -887 326	13.00 -227 41	1.00 -204 -173	1.00 -182 -173	1.00 -192 -131	1.00 -182 -121
1.00 -900 328	13.00 -230 44	1.00 -207 -173	1.00 -185 -173	1.00 -195 -131	1.00 -185 -121
1.00 -912 330	13.00 -233 47	1.00 -210 -173	1.00 -188 -173	1.00 -198 -131	1.00 -188 -121
1.00 -925 332	13.00 -236 50	1.00 -213 -173	1.00 -191 -173	1.00 -201 -131	1.00 -191 -121
1.00 -937 334	13.00 -239 53	1.00 -216 -173	1.00 -194 -173	1.00 -204 -131	1.00 -194 -121
1.00 -950 336	13.00 -242 56	1.00 -219 -173	1.00 -197 -173	1.00 -207 -131	1.00 -197 -121
1.00 -962 338	13.00 -245 59	1.00 -222 -173	1.00 -200 -173	1.00 -210 -131	1.00 -200 -121
1.00 -975 340	13.00 -248 62	1.00 -225 -173	1.00 -203 -173	1.00 -213 -131	1.00 -203 -121
1.00 -987 342	13.00 -251 65	1.00 -228 -173	1.00 -206 -173	1.00 -216 -131	1.00 -206 -121
1.00 -1000 344	13.00 -254 68	1.00 -231 -173	1.00 -209 -173	1.00 -219 -131	1.00 -209 -121
1.00 -1012 346	13.00 -257 71	1.00 -234 -173	1.00 -212 -173	1.00 -222 -131	1.00 -212 -121
1.00 -1025 348	13.00 -260 74	1.00 -237 -173	1.00 -215 -173	1.00 -225 -131	1.00 -215 -121
1.00 -1037 350	13.00 -263 77	1.00 -240 -173	1.00 -218 -173	1.00 -228 -131	1.00 -218 -121
1.00 -1050 352	13.00 -266 80	1.00 -243 -173	1.00 -221 -173	1.00 -231 -131	1.00 -221 -121
1.00 -1062 354	13.00 -269 83	1.00 -246 -173	1.00 -224 -173	1.00 -234 -131	1.00 -224 -121
1.00 -1075 356	13.00 -272 86	1.00 -249 -173	1.00 -227 -173	1.00 -237 -131	1.00 -227 -121
1.00 -1087 358	13.00 -275 89	1.00 -252 -173	1.00 -230 -173	1.00 -240 -131	1.00 -230 -121
1.00 -1100 360	13.00 -278 92	1.00 -255 -173	1		

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 80.00 LONG. = 270.00	GEOGRAPHIC LAT. = 80.00 LONG. = 285.00	GEOGRAPHIC LAT. = 80.00 LONG. = 300.00	GEOGRAPHIC LAT. = 90.00 LONG. = 315.00	GEOGRAPHIC LAT. = 90.00 LONG. = 330.00	GEOGRAPHIC LAT. = 80.00 LONG. = 345.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
18.00 77 -85	17.00 75 -56	10.00 77 -28	10.00 75 -5	10.00 73 13	10.00 71 23
9.00 77 -87	9.00 74 -57	9.00 76 -28	9.00 76 -4	9.00 73 15	9.00 71 30
0.00 77 -88	0.00 73 -58	0.00 78 -27	0.00 76 -1	0.00 71 18	0.00 71 39
7.00 77 -83	7.00 74 -55	7.00 78 -22	7.00 76 4	7.00 72 22	7.00 69 37
6.00 77 -87	6.00 73 -52	6.00 77 -18	6.00 74 0	6.00 71 24	6.00 67 38
5.00 77 -87	5.00 74 -51	5.00 76 -21	5.00 73 3	5.00 70 31	5.00 66 35
4.00 77 -88	4.00 74 -50	4.00 77 -18	4.00 73 7	4.00 69 25	4.00 66 39
3.00 76 -81	3.00 76 -53	3.00 76 -18	3.00 77 7	3.00 67 25	3.00 63 33
2.00 76 -82	2.00 75 -50	2.00 75 -12	2.00 77 0	2.00 64 30	2.00 59 43
1.00 76 -83	1.00 75 -51	1.00 75 -13	1.00 78 12	1.00 64 29	1.00 59 42
1.70 76 -93	1.70 78 -50	1.70 75 -11	1.70 78 13	1.70 64 18	1.70 58 44
1.60 76 -93	1.60 76 -49	1.60 74 -11	1.60 69 13	1.60 63 18	1.60 57 44
1.50 76 -94	1.50 74 -50	1.50 74 -11	1.50 69 13	1.50 63 10	1.50 57 43
1.40 76 -94	1.40 73 -49	1.40 74 -9	1.40 68 15	1.40 62 11	1.40 56 45
1.30 76 -94	1.30 77 -50	1.30 74 -10	1.30 68 14	1.30 61 31	1.30 56 44
1.20 76 -95	1.20 77 -48	1.20 74 -4	1.20 67 16	1.20 61 32	1.20 55 46
1.10 76 -96	1.10 76 -49	1.10 74 -8	1.10 67 16	1.10 60 37	1.10 54 48
1.00 75 -96	1.00 77 -49	1.00 73 -8	1.00 66 16	1.00 59 32	1.00 53 46
0.90 75 -96	0.90 77 -48	0.90 73 -7	0.90 66 16	0.90 58 33	0.90 52 46
0.80 75 -97	0.80 77 -47	0.80 73 -6	0.80 65 18	0.80 56 34	0.80 51 47
0.70 75 -98	0.70 77 -47	0.70 72 -6	0.70 64 18	0.70 56 34	0.70 49 47
0.60 75 -99	0.60 77 -47	0.60 72 -5	0.60 63 18	0.60 55 34	0.60 47 48
0.50 75 -100	0.50 77 -46	0.50 71 -4	0.50 62 19	0.50 53 35	0.50 44 49
0.40 74 -101	0.40 76 -45	0.40 70 -2	0.40 60 21	0.40 51 36	0.40 42 50
0.30 74 -102	0.30 76 -44	0.30 69 -1	0.30 58 21	0.30 47 37	0.30 37 51
0.20 74 -103	0.20 75 -42	0.20 67 0	0.20 55 21	0.20 43 37	0.20 31 52
0.10 73 -103	0.10 74 -41	0.10 66 1	0.10 50 21	0.10 38 38	0.10 19 53
0.00 73 -110	0.00 75 -41	0.00 63 1	0.00 46 22	0.00 33 37	0.00 17 54
0.00 73 -111	0.00 74 -40	0.00 63 0	0.00 46 21	0.00 32 37	0.00 16 53
0.00 73 -111	0.00 74 -41	0.00 62 0	0.00 46 21	0.00 32 37	0.00 16 53
0.00 73 -112	0.00 74 -40	0.00 61 0	0.00 46 20	0.00 31 36	0.00 15 54
0.00 73 -113	0.00 74 -40	0.00 61 -1	0.00 46 20	0.00 31 36	0.00 15 54
0.00 73 -114	0.00 74 -41	0.00 60 -1	0.00 45 19	0.00 30 35	0.00 14 53
0.00 73 -115	0.00 74 -41	0.00 59 -2	0.00 45 17	0.00 29 34	0.00 13 52
0.00 73 -116	0.00 73 -41	0.00 58 -3	0.00 44 16	0.00 28 33	0.00 12 51
0.00 73 -117	0.00 73 -41	0.00 57 -4	0.00 43 15	0.00 27 32	0.00 11 50
0.00 73 -118	0.00 73 -42	0.00 56 -5	0.00 42 14	0.00 26 31	0.00 10 49

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. * 75.00 LONG. * 0.00	GEOGRAPHIC LAT. * 75.00 LONG. * 15.00	GEOGRAPHIC LAT. * 75.00 LONG. * 30.00	GEOGRAPHIC LAT. * 75.00 LONG. * 45.00	GEOGRAPHIC LAT. * 75.00 LONG. * 60.00	GEOGRAPHIC LAT. * 75.00 LONG. * 75.00	GEOGRAPHIC LAT. * 75.00 LONG. * 90.00	GEOGRAPHIC LAT. * 75.00 LONG. * 105.00	GEOGRAPHIC LAT. * 75.00 LONG. * 120.00	GEOGRAPHIC LAT. * 75.00 LONG. * 135.00	GEOGRAPHIC LAT. * 75.00 LONG. * 150.00	GEOGRAPHIC LAT. * 75.00 LONG. * 165.00	GEOGRAPHIC LAT. * 75.00 LONG. * 180.00	GEOGRAPHIC LAT. * 75.00 LONG. * 195.00	GEOGRAPHIC LAT. * 75.00 LONG. * 210.00	GEOGRAPHIC LAT. * 75.00 LONG. * 225.00	GEOGRAPHIC LAT. * 75.00 LONG. * 240.00	GEOGRAPHIC LAT. * 75.00 LONG. * 255.00	GEOGRAPHIC LAT. * 75.00 LONG. * 270.00	GEOGRAPHIC LAT. * 75.00 LONG. * 285.00	GEOGRAPHIC LAT. * 75.00 LONG. * 300.00	GEOGRAPHIC LAT. * 75.00 LONG. * 315.00	GEOGRAPHIC LAT. * 75.00 LONG. * 330.00	GEOGRAPHIC LAT. * 75.00 LONG. * 345.00	GEOGRAPHIC LAT. * 75.00 LONG. * 360.00		
MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	
10.00 97 37	13.00 50 51	10.00 55 64	10.00 59 78	10.00 64 93	10.00 68 107	10.00 73 122	10.00 78 137	10.00 83 152	10.00 88 167	10.00 93 182	10.00 98 197	10.00 103 212	10.00 108 227	10.00 113 242	10.00 118 257	10.00 123 272	10.00 128 287	10.00 133 302	10.00 138 317	10.00 143 332	10.00 148 347	10.00 153 362	10.00 158 377	10.00 163 392	10.00 168 407	10.00 173 422
9.00 97 38	13.00 50 52	9.00 55 65	9.00 59 79	9.00 64 94	9.00 68 108	9.00 73 123	9.00 78 138	9.00 83 153	9.00 88 168	9.00 93 183	9.00 98 198	9.00 103 213	9.00 108 228	9.00 113 243	9.00 118 258	9.00 123 273	9.00 128 288	9.00 133 303	9.00 138 318	9.00 143 333	9.00 148 348	9.00 153 363	9.00 158 378	9.00 163 393	9.00 168 408	9.00 173 423
8.00 97 39	13.00 50 53	8.00 55 66	8.00 59 80	8.00 64 95	8.00 68 109	8.00 73 124	8.00 78 139	8.00 83 154	8.00 88 169	8.00 93 184	8.00 98 199	8.00 103 214	8.00 108 229	8.00 113 244	8.00 118 259	8.00 123 274	8.00 128 289	8.00 133 304	8.00 138 319	8.00 143 334	8.00 148 349	8.00 153 364	8.00 158 379	8.00 163 394	8.00 168 409	8.00 173 424
7.00 97 40	13.00 50 54	7.00 55 67	7.00 59 81	7.00 64 96	7.00 68 110	7.00 73 125	7.00 78 140	7.00 83 155	7.00 88 170	7.00 93 185	7.00 98 200	7.00 103 215	7.00 108 230	7.00 113 245	7.00 118 260	7.00 123 275	7.00 128 290	7.00 133 305	7.00 138 320	7.00 143 335	7.00 148 350	7.00 153 365	7.00 158 380	7.00 163 395	7.00 168 410	7.00 173 425
6.00 97 41	13.00 50 55	6.00 55 68	6.00 59 82	6.00 64 97	6.00 68 111	6.00 73 126	6.00 78 141	6.00 83 156	6.00 88 171	6.00 93 186	6.00 98 201	6.00 103 216	6.00 108 231	6.00 113 246	6.00 118 261	6.00 123 276	6.00 128 291	6.00 133 306	6.00 138 321	6.00 143 336	6.00 148 351	6.00 153 366	6.00 158 381	6.00 163 396	6.00 168 411	6.00 173 426
5.00 97 42	13.00 50 56	5.00 55 69	5.00 59 83	5.00 64 98	5.00 68 112	5.00 73 127	5.00 78 142	5.00 83 157	5.00 88 172	5.00 93 187	5.00 98 202	5.00 103 217	5.00 108 232	5.00 113 247	5.00 118 262	5.00 123 277	5.00 128 292	5.00 133 307	5.00 138 322	5.00 143 337	5.00 148 352	5.00 153 367	5.00 158 382	5.00 163 397	5.00 168 412	5.00 173 427
4.00 97 43	13.00 50 57	4.00 55 70	4.00 59 84	4.00 64 99	4.00 68 113	4.00 73 128	4.00 78 143	4.00 83 158	4.00 88 173	4.00 93 188	4.00 98 203	4.00 103 218	4.00 108 233	4.00 113 248	4.00 118 263	4.00 123 278	4.00 128 293	4.00 133 308	4.00 138 323	4.00 143 338	4.00 148 353	4.00 153 368	4.00 158 383	4.00 163 398	4.00 168 413	4.00 173 428
3.00 97 44	13.00 50 58	3.00 55 71	3.00 59 85	3.00 64 100	3.00 68 114	3.00 73 129	3.00 78 144	3.00 83 159	3.00 88 174	3.00 93 189	3.00 98 204	3.00 103 219	3.00 108 234	3.00 113 249	3.00 118 264	3.00 123 279	3.00 128 294	3.00 133 309	3.00 138 324	3.00 143 339	3.00 148 354	3.00 153 369	3.00 158 384	3.00 163 399	3.00 168 414	3.00 173 429
2.00 97 45	13.00 50 59	2.00 55 72	2.00 59 86	2.00 64 101	2.00 68 115	2.00 73 130	2.00 78 145	2.00 83 160	2.00 88 175	2.00 93 190	2.00 98 205	2.00 103 220	2.00 108 235	2.00 113 250	2.00 118 265	2.00 123 280	2.00 128 295	2.00 133 310	2.00 138 325	2.00 143 340	2.00 148 355	2.00 153 370	2.00 158 385	2.00 163 400	2.00 168 415	2.00 173 430
1.00 97 46	13.00 50 60	1.00 55 73	1.00 59 87	1.00 64 102	1.00 68 116	1.00 73 131	1.00 78 146	1.00 83 161	1.00 88 176	1.00 93 191	1.00 98 206	1.00 103 221	1.00 108 236	1.00 113 251	1.00 118 266	1.00 123 281	1.00 128 296	1.00 133 311	1.00 138 326	1.00 143 341	1.00 148 356	1.00 153 371	1.00 158 386	1.00 163 401	1.00 168 416	1.00 173 431
0.00 97 47	13.00 50 61	0.00 55 74	0.00 59 88	0.00 64 103	0.00 68 117	0.00 73 132	0.00 78 147	0.00 83 162	0.00 88 177	0.00 93 192	0.00 98 207	0.00 103 222	0.00 108 237	0.00 113 252	0.00 118 267	0.00 123 282	0.00 128 297	0.00 133 312	0.00 138 327	0.00 143 342	0.00 148 357	0.00 153 372	0.00 158 387	0.00 163 402	0.00 168 417	0.00 173 432
315.00 97 48	13.00 50 62	315.00 55 75	315.00 59 89	315.00 64 104	315.00 68 118	315.00 73 133	315.00 78 148	315.00 83 163	315.00 88 178	315.00 93 193	315.00 98 208	315.00 103 223	315.00 108 238	315.00 113 253	315.00 118 268	315.00 123 283	315.00 128 298	315.00 133 313	315.00 138 328	315.00 143 343	315.00 148 358	315.00 153 373	315.00 158 388	315.00 163 403	315.00 168 418	315.00 173 433
330.00 97 49	13.00 50 63	330.00 55 76	330.00 59 90	330.00 64 105	330.00 68 119	330.00 73 134	330.00 78 149	330.00 83 164	330.00 88 179	330.00 93 194	330.00 98 209	330.00 103 224	330.00 108 239	330.00 113 254	330.00 118 269	330.00 123 284	330.00 128 299	330.00 133 314	330.00 138 329	330.00 143 344	330.00 148 359	330.00 153 374	330.00 158 389	330.00 163 404	330.00 168 419	330.00 173 434
345.00 97 50	13.00 50 64	345.00 55 77	345.00 59 91	345.00 64 106	345.00 68 120	345.00 73 135	345.00 78 150	345.00 83 165	345.00 88 180	345.00 93 195	345.00 98 210	345.00 103 225	345.00 108 240	345.00 113 255	345.00 118 270	345.00 123 285	345.00 128 300	345.00 133 315	345.00 138 330	345.00 143 345	345.00 148 360	345.00 153 375	345.00 158 390	345.00 163 405	345.00 168 420	345.00 173 435
360.00 97 51	13.00 50 65	360.00 55 78	360.00 59 92	360.00 64 107	360.00 68 121	360.00 73 136	360.00 78 151	360.00 83 166	360.00 88 181	360.00 93 196	360.00 98 211	360.00 103 226	360.00 108 241	360.00 113 256	360.00 118 271	360.00 123 286	360.00 128 301	360.00 133 316	360.00 138 331	360.00 143 346	360.00 148 361	360.00 153 376	360.00 158 391	360.00 163 406	360.00 168 421	360.00 173 436
375.00 97 52	13.00 50 66	375.00 55 79	375.00 59 93	375.00 64 108	375.00 68 122	375.00 73 137	375.00 78 152	375.00 83 167	375.00 88 182	375.00 93 197	375.00 98 212	375.00 103 227	375.00 108 242	375.00 113 257	375.00 118 272	375.00 123 287	375.00 128 302	375.00 133 317	375.00 138 332	375.00 143 347	375.00 148 362	375.00 153 377	375.00 158 392	375.00 163 407	375.00 168 422	375.00 173 437
390.00 97 53	13.00 50 67	390.00 55 80	390.00 59 94	390.00 64 109	390.00 68 123	390.00 73 138	390.00 78 153	390.00 83 168	390.00 88 183	390.00 93 198	390.00 98 213	390.00 103 228	390.00 108 243	390.00 113 258	390.00 118 273	390.00 123 288	390.00 128 303	390.00 133 318	390.00 138 333	390.00 143 348	390.00 148 363	390.00 153 378	390.00 158 393	390.00 163 408	390.00 168 423	390.00 173 438
405.00 97 54	13.00 50 68	405.00 55 81	405.00 59 95	405.00 64 110	405.00 68 124	405.00 73 139	405.00 78 154	405.00 83 169	405.00 88 184	405.00 93 199	405.00 98 214	405.00 103 229	405.00 108 244	405.00 113 259	405.00 118 274	405.00 123 289	405.00 128 304	405.00 133 319	405.00 138 334	405.00 143 349	405.00 148 364	405.00 153 379	405.00 158 394	405.00 163 409	405.00 168 424	405.00 173 439
420.00 97 55	13.00 50 69	420.00 55 82	420.00 59 96	420.00 64 111	420.00 68 125	420.00 73 140	420.00 78 155	420.00 83 170	420.00 88 185	420.00 93 200	420.00 98 215	420.00 103 230	420.00 108 245	420.00 113 260	420.00 118 275	420.00 123 290	420.00 128 305	420.00 133 320	420.00 138 335	420.00 143 350	420.00 148 365	420.00 153 380	420.00 158 395	420.00 163 410	420.00 168 425	420.00 173 440
435.00 97 56	13.00 50 70	435.00 55 83	435.00 59 97	435.00 64 112	435.00 68 126	435.00 73 141	435.00 78 156	435.00 83 171	435.00 88 186	435.00 93 201	435.00 98 216	435.00 103 231	435.00 108 246	435.00 113 261	435.00 118 276	435.00 123 291	435.00 128 306	435.00 133 321	435.00 138 336	435.00 143 351	435.00 148 366	435.00 153 381	435.00 158 396	435.00 163 411	435.00 168 426	435.00 173 441
450.00 97 57	13.00 50 71	450.00 55 84	450.00 59 98	450.00 64 113	450.00 68 127	450.00 73 142	450.00 78 157	450.00 83 172	450.00 88 187	450.00 93 202	450.00 98 217	450.00 103 232	450.00 108 247	450.00 113 262	450.00 118 277	450.00 123 292	450.00 128 307	450.00 133 322	450.00 138 337	450.00 143 352	450.00 148 367	450.00 153 382	450.00 158 397	450.00 163 412	450.00 168 427	450.00 173 442
465.00 97 58	13.00 50 72	465.00 55 85	465.00 59 99	465.00 64 114	465.00 68 128	465.00 73 143	465.00 78 158	465.00 83 173	465.00 88 188	465.00 93 203	465.00 98 218	465.00 103 233	465.00 108 248	465.00 113 263	465.00 118 278	465.00 123 293	465.00 128 308	465.00 133 323	465.00 138 338	465.00 143 353	465.00 148 368	465.00 153 383	465.00 158 398	465.00 163 413	465.00 168 428	465.00 173 443
480.00 97 59	13.00 50 73	480.00 55 86	480.00 59 100	480.00 64 115	480.00 68 129	480.00 73 144	480.00 78 159	480.00 83 174	480.00 88 189	480.00 93 204	480.00 98 219	480.00 103 234	480.00 108 249	480.00 113 264	480.00 118 279	480.00 123 294	480.00 128 309	480.00 133 324	480.00 138 339	480.00 143 354	480.00 148 369	480.00 153 384	480.00 158 399	480.00 163 414	480.00 168 429	480.00 173 444
495.00 97 60	13.00 50 74	495.00 55 87</																								

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 75.00 LONG. = 90.00		GEOGRAPHIC LAT. = 75.00 LONG. = 105.00		GEOGRAPHIC LAT. = 75.00 LONG. = 120.00		GEOGRAPHIC LAT. = 75.00 LONG. = 135.00		GEOGRAPHIC LAT. = 75.00 LONG. = 150.00		GEOGRAPHIC LAT. = 75.00 LONG. = 165.00	
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
10.00 52 122	17.00 50 136	10.00 48 149	10.00 47 161	10.00 46 172	10.00 45 183	10.00 44 194	10.00 43 205	10.00 42 216	10.00 41 227	10.00 40 238	10.00 39 249
9.00 51 123	16.00 49 137	9.00 47 150	9.00 46 162	9.00 45 173	9.00 44 184	9.00 43 195	9.00 42 206	9.00 41 217	9.00 40 228	9.00 39 239	9.00 38 250
8.00 49 124	15.00 47 138	8.00 45 151	8.00 44 163	8.00 43 174	8.00 42 185	8.00 41 196	8.00 40 207	8.00 39 218	8.00 38 229	8.00 37 240	8.00 36 251
7.00 47 124	14.00 45 139	7.00 43 152	7.00 42 164	7.00 41 175	7.00 40 186	7.00 39 197	7.00 38 208	7.00 37 219	7.00 36 230	7.00 35 241	7.00 34 252
6.00 46 124	13.00 43 140	6.00 41 153	6.00 40 165	6.00 39 176	6.00 38 187	6.00 37 198	6.00 36 209	6.00 35 220	6.00 34 231	6.00 33 242	6.00 32 253
5.00 44 124	12.00 41 141	5.00 39 154	5.00 38 166	5.00 37 177	5.00 36 188	5.00 35 199	5.00 34 210	5.00 33 221	5.00 32 232	5.00 31 243	5.00 30 254
4.00 41 124	11.00 39 142	4.00 37 155	4.00 36 167	4.00 35 178	4.00 34 189	4.00 33 200	4.00 32 211	4.00 31 222	4.00 30 233	4.00 29 244	4.00 28 255
3.00 38 126	10.00 37 143	3.00 35 156	3.00 34 168	3.00 33 179	3.00 32 190	3.00 31 201	3.00 30 212	3.00 29 223	3.00 28 234	3.00 27 245	3.00 26 256
2.00 35 126	9.00 35 144	2.00 33 157	2.00 32 169	2.00 31 180	2.00 30 191	2.00 29 202	2.00 28 213	2.00 27 224	2.00 26 235	2.00 25 246	2.00 24 257
1.00 32 129	8.00 33 145	1.00 31 158	1.00 30 170	1.00 29 181	1.00 28 192	1.00 27 203	1.00 26 214	1.00 25 225	1.00 24 236	1.00 23 247	1.00 22 258
1.00 22 130	7.00 31 146	1.00 29 159	1.00 28 171	1.00 27 182	1.00 26 193	1.00 25 204	1.00 24 215	1.00 23 226	1.00 22 237	1.00 21 248	1.00 20 259
1.00 20 131	6.00 29 147	1.00 27 160	1.00 26 172	1.00 25 183	1.00 24 194	1.00 23 205	1.00 22 216	1.00 21 227	1.00 20 238	1.00 19 249	1.00 18 260
1.00 18 131	5.00 27 148	1.00 25 161	1.00 24 173	1.00 23 184	1.00 22 195	1.00 21 206	1.00 20 217	1.00 19 228	1.00 18 239	1.00 17 250	1.00 16 261
1.00 17 132	4.00 25 149	1.00 23 162	1.00 22 174	1.00 21 185	1.00 20 196	1.00 19 207	1.00 18 218	1.00 17 229	1.00 16 240	1.00 15 251	1.00 14 262
1.00 15 133	3.00 23 150	1.00 21 163	1.00 20 175	1.00 19 186	1.00 18 197	1.00 17 208	1.00 16 219	1.00 15 230	1.00 14 241	1.00 13 252	1.00 12 263
1.00 14 133	2.00 21 151	1.00 19 164	1.00 18 176	1.00 17 187	1.00 16 198	1.00 15 209	1.00 14 220	1.00 13 231	1.00 12 242	1.00 11 253	1.00 10 264
1.00 13 133	1.00 19 152	1.00 17 165	1.00 16 177	1.00 15 188	1.00 14 199	1.00 13 210	1.00 12 221	1.00 11 232	1.00 10 243	1.00 09 254	1.00 08 265
1.00 12 135	1.00 17 153	1.00 15 166	1.00 14 178	1.00 13 189	1.00 12 200	1.00 11 211	1.00 10 222	1.00 09 233	1.00 08 244	1.00 07 255	1.00 06 266
1.00 10 135	1.00 15 154	1.00 13 167	1.00 12 179	1.00 11 190	1.00 10 201	1.00 09 212	1.00 08 223	1.00 07 234	1.00 06 245	1.00 05 256	1.00 04 267
1.00 8 136	1.00 13 155	1.00 11 168	1.00 10 180	1.00 09 191	1.00 08 202	1.00 07 213	1.00 06 224	1.00 05 235	1.00 04 246	1.00 03 257	1.00 02 268
1.00 5 138	1.00 11 156	1.00 09 169	1.00 08 181	1.00 07 192	1.00 06 203	1.00 05 214	1.00 04 225	1.00 03 236	1.00 02 247	1.00 01 258	1.00 00 269
0.00 2 140	1.00 09 157	1.00 07 170	1.00 06 182	1.00 05 193	1.00 04 204	1.00 03 215	1.00 02 226	1.00 01 237	1.00 00 248	1.00 00 259	1.00 00 270
0.00 2 144	1.00 07 158	1.00 05 171	1.00 04 183	1.00 03 194	1.00 02 205	1.00 01 216	1.00 00 227	1.00 00 238	1.00 00 249	1.00 00 260	1.00 00 271
0.00 2 148	1.00 05 159	1.00 03 172	1.00 02 184	1.00 01 195	1.00 00 206	1.00 00 217	1.00 00 228	1.00 00 239	1.00 00 250	1.00 00 261	1.00 00 272
0.00 2 152	1.00 03 160	1.00 01 173	1.00 00 185	1.00 00 196	1.00 00 207	1.00 00 218	1.00 00 229	1.00 00 240	1.00 00 251	1.00 00 262	1.00 00 273
0.00 2 156	1.00 01 161	1.00 00 174	1.00 00 186	1.00 00 197	1.00 00 208	1.00 00 219	1.00 00 230	1.00 00 241	1.00 00 252	1.00 00 263	1.00 00 274
0.00 2 160	1.00 00 162	1.00 00 175	1.00 00 187	1.00 00 198	1.00 00 209	1.00 00 220	1.00 00 231	1.00 00 242	1.00 00 253	1.00 00 264	1.00 00 275
0.00 2 164	1.00 00 163	1.00 00 176	1.00 00 188	1.00 00 199	1.00 00 210	1.00 00 221	1.00 00 232	1.00 00 243	1.00 00 254	1.00 00 265	1.00 00 276
0.00 2 168	1.00 00 164	1.00 00 177	1.00 00 189	1.00 00 200	1.00 00 211	1.00 00 222	1.00 00 233	1.00 00 244	1.00 00 255	1.00 00 266	1.00 00 277
0.00 2 172	1.00 00 165	1.00 00 178	1.00 00 190	1.00 00 201	1.00 00 212	1.00 00 223	1.00 00 234	1.00 00 245	1.00 00 256	1.00 00 267	1.00 00 278
0.00 2 176	1.00 00 166	1.00 00 179	1.00 00 191	1.00 00 202	1.00 00 213	1.00 00 224	1.00 00 235	1.00 00 246	1.00 00 257	1.00 00 268	1.00 00 279
0.00 2 180	1.00 00 167	1.00 00 180	1.00 00 192	1.00 00 203	1.00 00 214	1.00 00 225	1.00 00 236	1.00 00 247	1.00 00 258	1.00 00 269	1.00 00 280
0.00 2 184	1.00 00 168	1.00 00 181	1.00 00 193	1.00 00 204	1.00 00 215	1.00 00 226	1.00 00 237	1.00 00 248	1.00 00 259	1.00 00 270	1.00 00 281
0.00 2 188	1.00 00 169	1.00 00 182	1.00 00 194	1.00 00 205	1.00 00 216	1.00 00 227	1.00 00 238	1.00 00 249	1.00 00 260	1.00 00 271	1.00 00 282
0.00 2 192	1.00 00 170	1.00 00 183	1.00 00 195	1.00 00 206	1.00 00 217	1.00 00 228	1.00 00 239	1.00 00 250	1.00 00 261	1.00 00 272	1.00 00 283
0.00 2 196	1.00 00 171	1.00 00 184	1.00 00 196	1.00 00 207	1.00 00 218	1.00 00 229	1.00 00 240	1.00 00 251	1.00 00 262	1.00 00 273	1.00 00 284
0.00 2 200	1.00 00 172	1.00 00 185	1.00 00 197	1.00 00 208	1.00 00 219	1.00 00 230	1.00 00 241	1.00 00 252	1.00 00 263	1.00 00 274	1.00 00 285
0.00 2 204	1.00 00 173	1.00 00 186	1.00 00 198	1.00 00 209	1.00 00 220	1.00 00 231	1.00 00 242	1.00 00 253	1.00 00 264	1.00 00 275	1.00 00 286
0.00 2 208	1.00 00 174	1.00 00 187	1.00 00 199	1.00 00 210	1.00 00 221	1.00 00 232	1.00 00 243	1.00 00 254	1.00 00 265	1.00 00 276	1.00 00 287
0.00 2 212	1.00 00 175	1.00 00 188	1.00 00 200	1.00 00 211	1.00 00 222	1.00 00 233	1.00 00 244	1.00 00 255	1.00 00 266	1.00 00 277	1.00 00 288
0.00 2 216	1.00 00 176	1.00 00 189	1.00 00 201	1.00 00 212	1.00 00 223	1.00 00 234	1.00 00 245	1.00 00 256	1.00 00 267	1.00 00 278	1.00 00 289
0.00 2 220	1.00 00 177	1.00 00 190	1.00 00 202	1.00 00 213	1.00 00 224	1.00 00 235	1.00 00 246	1.00 00 257	1.00 00 268	1.00 00 279	1.00 00 290
0.00 2 224	1.00 00 178	1.00 00 191	1.00 00 203	1.00 00 214	1.00 00 225	1.00 00 236	1.00 00 247	1.00 00 258	1.00 00 269	1.00 00 280	1.00 00 291
0.00 2 228	1.00 00 179	1.00 00 192	1.00 00 204	1.00 00 215	1.00 00 226	1.00 00 237	1.00 00 248	1.00 00 259	1.00 00 270	1.00 00 281	1.00 00 292
0.00 2 232	1.00 00 180	1.00 00 193	1.00 00 205	1.00 00 216	1.00 00 227	1.00 00 238	1.00 00 249	1.00 00 260	1.00 00 271	1.00 00 282	1.00 00 293
0.00 2 236	1.00 00 181	1.00 00 194	1.00 00 206	1.00 00 217	1.00 00 228	1.00 00 239	1.00 00 250	1.00 00 261	1.00 00 272	1.00 00 283	1.00 00 294
0.00 2 240	1.00 00 182	1.00 00 195	1.00 00 207	1.00 00 218	1.00 00 229	1.00 00 240	1.00 00 251	1.00 00 262	1.00 00 273	1.00 00 284	1.00 00 295
0.00 2 244	1.00 00 183	1.00 00 196	1.00 00 208	1.00 00 219	1.00 00 230	1.00 00 241	1.00 00 252	1.00 00 263	1.00 00 274	1.00 00 285	1.00 00 296
0.00 2 248	1.00 00 184	1.00 00 197	1.00 00 209	1.00 00 220	1.00 00 231	1.00 00 242	1.00 00 253	1.00 00 264	1.00 00 275	1.00 00 286	1.00 00 297
0.00 2 252	1.00 00 185	1.00 00 198	1.00 00 210	1.00 00 221	1.00 00 232	1.00 00 243	1.00 00 254	1.00 00 265	1.00 00 276	1.00 00 287	1.00 00 298
0.00 2 256	1.00 00 186	1.00 00 199	1.00 00 211	1.00 00 222	1.00 00 233	1.00 00 244	1.00 00 255	1.00 00 266	1.00 00 277	1.00 00 288	1.00 00 299
0.00 2 260	1.00 00 187	1.00 00 200	1.00 00 212	1.00 00 223	1.00 00 234	1.00 00 245	1.00 00 256	1.00 00 267	1.00 00 278	1.00 00 289	1.00 00 300
0.00 2 264	1.00 00 188	1.00 00 201	1.00 00 213	1.00 00 224	1.00 00 235	1.00 00 246	1.00 00 257	1.00 00 268	1.00 00 279	1.00 00 290	1.00 00 301
0.00 2 268	1.00 00 189	1.00 00 202	1.00 00 214	1.00 00 225	1.00 00 236	1.00 00 247	1.00 00 258	1.00 00 269	1.00 00 280	1.00 00 291	1.00 00 302
0.00 2 272	1.00 00 190	1.00 00 203	1.00 00 215	1.00 00 226	1.00 00 237	1.00 00 248	1.00 00 259	1.00 00 270	1.00 00 281	1.00 00 292	1.00 00 303
0.00 2 276	1.00 00 191	1.00 00 204	1.00 00 216	1.00 00 227	1.00 00 238	1.00 00 249	1.00 00 260	1.00 00 271	1.00 00 282	1.00 00 293	1.00 00 304
0.00 2 280	1.00 00 192	1.00 00 205	1.00 00 217	1.00 00 228	1.00 00 239	1.00 00 250	1.00 00 261	1.00 00 272	1.00 00 283	1.00 00 294	1.00 00 305
0.00 2 284	1.00 00 193	1.00 00 206	1.00 00 218	1.00 00 229	1.00 00 240	1.00 00 251	1.00 00 262	1.00 00 273	1.00 00 284	1.00 00 295	1.00 00 306
0.00 2 288	1.00 00 194	1.00 00 207	1.00 00 219	1.00 00 230	1.00 00 241	1.00 00 252	1.00 00 263	1.00 00 274	1.00 00 285	1.00 00 296	1.00 00 307
0.00 2 292	1.00 00 195	1.00 00 208	1.00 00 220	1.00 00 231	1.00 00 242	1.00 00 253	1.00 00 264	1.00 00			

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC (GV) LAT LONG	GEOGRAPHIC LAT. = 75.00 LONG. = 180.00	GEOGRAPHIC LAT. = 75.00 LONG. = 210.00	GEOGRAPHIC LAT. = 75.00 LONG. = 225.00	GEOGRAPHIC LAT. = 75.00 LONG. = 240.00	GEOGRAPHIC LAT. = 75.00 LONG. = 255.00
	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
10.00 47 192	11.00 50 -154	10.00 53 -147	10.00 57 -114	10.00 62 -119	10.00 65 -100
9.00 47 192	9.00 50 -157	9.00 53 -146	9.00 57 -114	9.00 61 -119	9.00 65 -101
8.00 46 194	8.00 49 -157	8.00 52 -145	8.00 56 -113	8.00 60 -119	8.00 65 -101
7.00 44 195	7.00 46 -155	7.00 50 -145	7.00 54 -113	7.00 59 -119	7.00 64 -101
6.00 40 195	6.00 43 -156	6.00 47 -146	6.00 52 -114	6.00 56 -120	6.00 63 -102
5.00 37 192	5.00 41 -158	5.00 46 -148	5.00 51 -116	5.00 56 -122	5.00 62 -103
4.00 35 193	4.00 39 -157	4.00 44 -147	4.00 49 -116	4.00 55 -121	4.00 61 -103
3.00 30 192	3.00 34 -159	3.00 40 -149	3.00 46 -117	3.00 53 -123	3.00 59 -104
2.00 21 194	2.00 20 -158	2.00 33 -149	2.00 41 -118	2.00 49 -125	2.00 57 -106
1.90 20 194	1.90 25 -159	1.90 32 -150	1.90 41 -119	1.90 49 -125	1.90 57 -106
1.80 19 193	1.80 25 -159	1.80 32 -150	1.80 40 -119	1.80 49 -125	1.80 56 -106
1.70 18 194	1.70 24 -158	1.70 31 -149	1.70 39 -119	1.70 48 -125	1.70 56 -106
1.60 16 194	1.60 22 -158	1.60 30 -150	1.60 38 -119	1.60 47 -126	1.60 56 -107
1.50 15 194	1.50 21 -158	1.50 29 -150	1.50 36 -119	1.50 47 -126	1.50 55 -107
1.40 13 195	1.40 20 -158	1.40 28 -150	1.40 37 -119	1.40 46 -126	1.40 55 -107
1.30 11 194	1.30 18 -158	1.30 26 -150	1.30 36 -140	1.30 46 -126	1.30 54 -107
1.20 9 194	1.20 16 -157	1.20 25 -150	1.20 35 -140	1.20 45 -126	1.20 54 -108
1.10 7 196	1.10 14 -157	1.10 23 -150	1.10 34 -140	1.10 44 -127	1.10 53 -108
1.00 4 197	1.00 12 -157	1.00 22 -150	1.00 32 -140	1.00 43 -127	1.00 52 -108
.90 1 198	.90 9 -157	.90 19 -150	.90 31 -141	.90 42 -127	.90 52 -109
.80 -2 200	.80 6 -156	.80 17 -149	.80 29 -141	.80 40 -128	.80 51 -109
.70 -7 202	.70 3 -155	.70 14 -150	.70 27 -141	.70 39 -129	.70 50 -110
.60 -12 206	.60 -2 -153	.60 10 -149	.60 24 -141	.60 37 -129	.60 49 -110
.50 -19 212	.50 -5 -151	.50 6 -148	.50 21 -142	.50 35 -129	.50 47 -111
.40 -27 225	.40 -16 -145	.40 -1 -147	.40 16 -142	.40 32 -131	.40 45 -112
.30 -29 259	.30 -27 -133	.30 -9 -144	.30 10 -142	.30 28 -132	.30 43 -113
.20 -26 264	.20 -23 -85	.20 -24 -135	.20 0 -147	.20 22 -133	.20 39 -115
.10 -22 278	.10 -19 -76	.10 -26 -132	.10 -21 -137	.10 11 -136	.10 33 -119
.00 -22 278	.00 -18 -63	.00 -28 -131	.00 -25 -135	.00 10 -137	.00 32 -120
-.10 -20 285	-.10 -16 -63	-.10 -31 -126	-.08 -29 -135	-.06 8 -136	-.00 31 -121
-.20 -18 296	-.15 -14 -1	-.16 -33 -123	-.07 -34 -131	-.07 6 -139	-.07 31 -122
-.30 -13 308	-.15 -9 180	-.15 -35 -117	-.06 -41 -125	-.06 3 -140	-.06 30 -123
-.40 -12 332	-.14 9 120	-.14 -37 -111	-.05 -49 -103	-.05 0 -141	-.05 28 -124
-.50 -5 412	-.13 3 120	-.13 -38 -100	-.04 -59 -46	-.04 -4 -142	-.04 27 -125
-.60 25 467	-.13 3 120	-.12 -37 -88	-.03 6 19	-.03 -7 -145	-.03 25 -127
-.70 10 517	-.11 -31 -70	-.11 -31 -68	-.02 6 19	-.02 -11 -149	-.02 25 -130
-.80 1 588	-.08 -12 637	-.08 -12 637	-.02 6 19	-.01 -16 -155	-.01 23 -133

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 75.00 LONG. = 270.00		GEOGRAPHIC LAT. = 75.00 LONG. = 285.00		GEOGRAPHIC LAT. = 75.00 LONG. = 300.00		GEOGRAPHIC LAT. = 75.00 LONG. = 315.00		GEOGRAPHIC LAT. = 75.00 LONG. = 330.00		GEOGRAPHIC LAT. = 75.00 LONG. = 345.00	
RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG	
10.00 60 -78		11.00 60 -53		10.00 67 -29		10.00 65 -9		10.00 62 8		10.00 59 23	
9.00 60 -78		3.00 60 -54		9.00 67 -30		9.00 65 -9		9.00 62 9		9.00 60 24	
8.00 67 -79		3.00 63 -53		8.00 68 -29		8.00 65 -7		8.00 62 11		8.00 59 27	
7.00 67 -78		7.00 63 -52		7.00 67 -26		7.00 65 -4		7.00 61 15		7.00 58 38	
6.00 67 -78		5.00 68 -50		6.00 66 -23		6.00 62 -1		6.00 59 16		6.00 55 31	
5.00 65 -78		5.00 66 -51		5.00 64 -25		5.00 61 -4		5.00 56 14		5.00 53 29	
4.00 65 -79		4.00 66 -51		4.00 64 -25		4.00 61 -4		4.00 56 16		4.00 52 32	
3.00 64 -80		1.00 65 -51		3.00 65 -24		3.00 58 -2		3.00 56 17		3.00 48 32	
2.00 62 -80		2.00 63 -49		2.00 60 -21		2.00 55 2		2.00 53 17		2.00 43 36	
1.00 62 -80		1.00 63 -50		1.00 60 -21		1.00 54 2		1.00 48 20		1.00 42 38	
1.00 61 -80		1.00 63 -50		1.00 60 -21		1.00 54 2		1.00 48 20		1.00 42 38	
1.00 61 -80		1.00 62 -49		1.00 59 -20		1.00 53 3		1.00 46 22		1.00 40 38	
1.00 60 -81		1.00 62 -49		1.00 59 -20		1.00 53 3		1.00 46 22		1.00 40 38	
1.00 60 -81		1.00 61 -50		1.00 58 -20		1.00 52 4		1.00 45 22		1.00 39 39	
1.00 60 -81		1.00 61 -50		1.00 58 -20		1.00 52 4		1.00 45 22		1.00 39 39	
1.00 59 -81		1.00 61 -49		1.00 57 -19		1.00 51 4		1.00 44 22		1.00 38 39	
1.00 59 -81		1.00 61 -49		1.00 57 -20		1.00 50 4		1.00 42 23		1.00 36 39	
1.00 59 -82		1.00 60 -49		1.00 56 -19		1.00 49 4		1.00 41 23		1.00 33 40	
1.00 58 -82		1.00 60 -49		1.00 56 -19		1.00 49 4		1.00 41 23		1.00 33 40	
1.00 58 -82		1.00 59 -49		1.00 55 -18		1.00 48 5		1.00 39 24		1.00 31 41	
1.00 57 -82		1.00 59 -49		1.00 55 -18		1.00 47 6		1.00 38 25		1.00 29 42	
1.00 56 -83		1.00 58 -49		1.00 54 -18		1.00 45 6		1.00 36 26		1.00 27 43	
1.00 56 -83		1.00 58 -49		1.00 54 -18		1.00 45 6		1.00 36 26		1.00 27 43	
1.00 55 -83		1.00 57 -49		1.00 53 -17		1.00 43 7		1.00 33 26		1.00 24 45	
1.00 55 -83		1.00 56 -49		1.00 53 -17		1.00 43 7		1.00 33 26		1.00 24 45	
1.00 54 -84		1.00 56 -49		1.00 52 -17		1.00 41 7		1.00 31 27		1.00 20 46	
1.00 54 -84		1.00 55 -49		1.00 52 -17		1.00 41 7		1.00 31 27		1.00 20 46	
1.00 53 -85		1.00 54 -49		1.00 51 -17		1.00 39 8		1.00 27 29		1.00 16 48	
1.00 53 -85		1.00 54 -49		1.00 51 -17		1.00 39 8		1.00 27 29		1.00 16 48	
1.00 52 -86		1.00 53 -49		1.00 50 -17		1.00 35 9		1.00 22 31		1.00 9 52	
1.00 52 -86		1.00 53 -49		1.00 50 -17		1.00 35 9		1.00 22 31		1.00 9 52	
1.00 51 -86		1.00 52 -49		1.00 49 -17		1.00 30 10		1.00 14 33		1.00 2 54	
1.00 51 -86		1.00 52 -49		1.00 49 -17		1.00 30 10		1.00 14 33		1.00 2 54	
1.00 50 -87		1.00 51 -49		1.00 48 -17		1.00 20 11		1.00 2 40		1.00 2 54	
1.00 50 -87		1.00 51 -49		1.00 48 -17		1.00 20 11		1.00 2 40		1.00 2 54	
1.00 49 -87		1.00 50 -49		1.00 47 -17		1.00 18 10		1.00 4 40		1.00 2 54	
1.00 49 -87		1.00 50 -49		1.00 47 -17		1.00 18 10		1.00 4 40		1.00 2 54	
1.00 48 -88		1.00 49 -49		1.00 46 -17		1.00 16 11		1.00 8 44		1.00 2 54	
1.00 48 -88		1.00 49 -49		1.00 46 -17		1.00 16 11		1.00 8 44		1.00 2 54	
1.00 47 -89		1.00 48 -49		1.00 45 -18		1.00 14 11		1.00 11 45		1.00 2 54	
1.00 47 -89		1.00 48 -49		1.00 45 -18		1.00 14 11		1.00 11 45		1.00 2 54	
1.00 46 -89		1.00 47 -49		1.00 44 -18		1.00 11 11		1.00 15 46		1.00 2 54	
1.00 46 -89		1.00 47 -49		1.00 44 -18		1.00 11 11		1.00 15 46		1.00 2 54	
1.00 45 -90		1.00 46 -49		1.00 43 -18		1.00 9 10		1.00 15 46		1.00 2 54	
1.00 45 -90		1.00 46 -49		1.00 43 -18		1.00 9 10		1.00 15 46		1.00 2 54	
1.00 44 -91		1.00 45 -49		1.00 42 -18		1.00 6 10		1.00 15 46		1.00 2 54	
1.00 44 -91		1.00 45 -49		1.00 42 -18		1.00 6 10		1.00 15 46		1.00 2 54	
1.00 43 -92		1.00 44 -49		1.00 41 -19		1.00 5 10		1.00 15 46		1.00 2 54	
1.00 43 -92		1.00 44 -49		1.00 41 -19		1.00 5 10		1.00 15 46		1.00 2 54	
1.00 42 -93		1.00 43 -49		1.00 40 -20		1.00 4 10		1.00 15 46		1.00 2 54	
1.00 42 -93		1.00 43 -49		1.00 40 -20		1.00 4 10		1.00 15 46		1.00 2 54	
1.00 41 -94		1.00 42 -49		1.00 39 -21		1.00 3 10		1.00 15 46		1.00 2 54	
1.00 41 -94		1.00 42 -49		1.00 39 -21		1.00 3 10		1.00 15 46		1.00 2 54	
1.00 40 -95		1.00 41 -49		1.00 38 -22		1.00 2 10		1.00 15 46		1.00 2 54	
1.00 40 -95		1.00 41 -49		1.00 38 -22		1.00 2 10		1.00 15 46		1.00 2 54	
1.00 39 -96		1.00 40 -49		1.00 37 -23		1.00 1 10		1.00 15 46		1.00 2 54	
1.00 39 -96		1.00 40 -49		1.00 37 -23		1.00 1 10		1.00 15 46		1.00 2 54	
1.00 38 -97		1.00 39 -49		1.00 36 -24		1.00 0 10		1.00 15 46		1.00 2 54	
1.00 38 -97		1.00 39 -49		1.00 36 -24		1.00 0 10		1.00 15 46		1.00 2 54	
1.00 37 -98		1.00 38 -49		1.00 35 -25		1.00 0 10		1.00 15 46		1.00 2 54	
1.00 37 -98		1.00 38 -49		1.00 35 -25		1.00 0 10		1.00 15 46		1.00 2 54	
1.00 36 -99		1.00 37 -49		1.00 34 -26		1.00 0 10		1.00 15 46		1.00 2 54	
1.00 36 -99		1.00 37 -49		1.00 34 -26		1.00 0 10		1.00 15 46		1.00 2 54	
1.00 35 -100		1.00 36 -49		1.00 33 -27		1.00 0 10		1.00 15 46		1.00 2 54	
1.00 35 -100		1.00 36 -49		1.00 33 -27		1.00 0 10		1.00 15 46		1.00 2 54	

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = 70.00			LAT. = 70.00			LAT. = 70.00			LAT. = 70.00			LAT. = 70.00		
LONG. = 0.00			LONG. = 30.00			LONG. = 45.00			LONG. = 60.00			LONG. = 75.00		
RIG ASYMPTOTIC	LAT LONG		RIG ASYMPTOTIC	LAT LONG		RIG ASYMPTOTIC	LAT LONG		RIG ASYMPTOTIC	LAT LONG		RIG ASYMPTOTIC	LAT LONG	
(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG
10.00	45	36	10.00	44	50	10.00	43	64	10.00	43	78	10.00	43	93
9.00	45	37	9.00	44	51	9.00	43	65	9.00	42	79	9.00	41	109
8.00	45	39	8.00	43	53	8.00	42	67	8.00	42	81	8.00	39	110
7.00	43	43	7.00	41	56	7.00	39	70	7.00	38	84	7.00	36	132
6.00	39	43	6.00	36	58	6.00	34	71	6.00	33	85	6.00	31	113
5.00	39	43	5.00	32	57	5.00	31	70	5.00	30	84	5.00	28	112
4.00	34	45	4.00	31	59	4.00	29	73	4.00	27	87	4.00	24	115
3.00	27	47	3.00	24	62	3.00	21	76	3.00	20	89	3.00	17	118
2.00	20	53	2.00	16	69	2.00	12	83	2.00	10	98	2.00	7	112
1.90	18	54	1.90	13	70	1.90	10	84	1.90	7	93	1.90	4	127
1.80	17	54	1.80	12	71	1.80	9	85	1.80	6	94	1.80	3	128
1.70	16	55	1.70	11	71	1.70	8	86	1.70	6	101	1.70	1	138
1.60	15	57	1.60	10	73	1.60	6	88	1.60	3	103	1.60	-2	132
1.50	12	57	1.50	7	74	1.50	4	90	1.50	1	105	1.50	-3	134
1.40	12	58	1.40	7	75	1.40	3	91	1.40	-3	107	1.40	-5	137
1.30	9	58	1.30	4	78	1.30	0	95	1.30	-3	110	1.30	-8	141
1.20	8	61	1.20	3	79	1.20	-1	97	1.20	-4	114	1.20	-10	145
1.10	5	64	1.10	-1	83	1.10	-5	101	1.10	-7	118	1.10	-12	151
1.00	3	67	1.00	-3	87	1.00	-7	106	1.00	-10	125	1.00	-14	159
.90	0	70	.90	-6	91	.90	-9	113	.90	-12	133	.90	-15	169
.80	-3	74	.80	-8	98	.80	-11	122	.80	-12	144	.80	-13	184
.70	-6	79	.70	-10	106	.70	-11	134	.70	-9	161	.70	-5	211
.60	-9	88	.60	-11	121	.60	-6	156	.60	2	192	.60	-3	214
.50	-11	102	.50	-4	146	.50	13	208	.50	5	198	.60	-2	217
.40	-7	128	.40	13	230	.40	14	219	.50	7	203	.60	-1	221
.30	-5	132	.40	-21	263	.40	12	237	.50	8	209	.60	1	226
.30	-3	136	.40	-1	324	.40	4	256	.50	10	210	.60	4	233
.30	-1	142	.40	9	327	.40	-13	363	.50	12	230	.60	6	239
.30	2	148	.40	16	359	.40	15	385	.50	11	241	.60	7	248
.30	5	153	.40	35	400	.40	18	400	.50	15	257	.60	8	254
.30	10	162	.40	51	427	.40	-18	453	.50	21	267	.60	8	267
.30	15	174	.40	61	459	.40	-1	496	.50	21	267	.60	8	267
.30	18	180	.40	61	459	.40	-1	496	.50	21	267	.60	8	267
.30	18	204	.40	61	459	.40	-1	496	.50	21	267	.60	8	267
.30	18	222	.40	61	459	.40	-1	496	.50	21	267	.60	8	267
.20	-3	682	.20	-3	682	.20	-3	682	.20	-3	682	.20	-3	682
.20	7	1607	.20	7	1607	.20	7	1607	.20	7	1607	.20	7	1607
.20	13	1171	.20	13	1171	.20	13	1171	.20	13	1171	.20	13	1171
.20	14	1	.20	14	1	.20	14	1	.20	14	1	.20	14	1

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 70.00 LONG. = 90.00	GEOGRAPHIC LAT. = 70.00 LONG. = 105.00	GEOGRAPHIC LAT. = 70.00 LONG. = 120.00	GEOGRAPHIC LAT. = 70.00 LONG. = 135.00	GEOGRAPHIC LAT. = 70.00 LONG. = 150.00	GEOGRAPHIC LAT. = 70.00 LONG. = 165.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
18.00 48 123	10.00 39 138	10.00 36 152	10.00 34 165	10.00 32 176	10.00 32 186
9.00 39 124	1.00 37 138	9.00 35 152	9.00 33 165	9.00 32 176	9.00 32 187
8.00 38 125	4.00 36 140	8.00 34 153	8.00 32 166	8.00 31 177	8.00 31 188
7.00 35 127	7.00 33 141	7.00 31 155	7.00 29 169	7.00 28 180	7.00 28 190
6.00 30 127	5.00 29 142	6.00 26 156	6.00 24 169	6.00 23 181	6.00 23 191
5.00 27 127	5.00 25 142	5.00 22 156	5.00 19 168	5.00 17 180	5.00 17 190
4.00 23 130	4.00 21 144	4.00 18 158	4.00 16 170	4.00 15 182	4.00 15 192
3.00 15 132	1.00 13 147	3.00 10 160	3.00 7 173	3.00 5 184	3.00 6 193
2.00 3 140	2.00 0 155	2.00 -3 169	2.00 -6 182	2.00 -8 193	2.00 -7 201
1.00 1 141	1.00 -2 156	1.00 -5 171	1.00 -8 184	1.00 -10 194	1.00 -10 202
1.00 0 143	1.00 -3 157	1.00 -7 172	1.00 -10 185	1.00 -12 196	1.00 -11 203
1.00 -1 145	1.00 -5 160	1.00 -8 174	1.00 -11 187	1.00 -13 198	1.00 -12 206
1.00 -4 147	1.00 -7 162	1.00 -11 177	1.00 -14 190	1.00 -16 201	1.00 -15 208
1.00 -6 149	1.00 -9 164	1.00 -13 179	1.00 -16 193	1.00 -18 204	1.00 -18 210
1.00 -8 152	1.00 -11 166	1.00 -15 183	1.00 -18 197	1.00 -20 207	1.00 -19 213
1.00 -10 156	1.00 -14 172	1.00 -18 190	1.00 -21 203	1.00 -23 213	1.00 -23 218
1.00 -13 161	1.00 -16 177	1.00 -20 196	1.00 -22 209	1.00 -24 219	1.00 -24 223
1.00 -15 167	1.00 -18 184	1.00 -21 202	1.00 -24 210	1.00 -26 226	1.00 -27 231
1.00 -17 176	1.00 -20 194	1.00 -22 213	1.00 -24 231	1.00 -26 241	1.00 -26 242
98 -17 180	30 -19 208	90 -19 229	90 -20 248	90 -22 258	90 -27 277
68 -14 205	40 -13 228	88 -11 252	88 -8 274	88 -9 286	88 -19 277
78 -2 230	70 3 260	70 6 312	70 -6 379	70 -8 286	70 1 313
68 -28 635	30 3 597	69 4 328	68 -4 624	78 -6 290	69 5 321
59 1 374	59 -12 646	66 -3 349	68 9 485	77 -4 293	68 8 318
58 -19 680	58 -3 1867	67 -13 398	67 -17 589	76 -1 300	67 9 337
57 6 384	57 -16 1360	66 -13 597	66 -13 535	75 3 308	66 18 349
56 3 415	56 -15 620	65 -10 725	65 -2 626	74 9 314	65 8 373
55 -8 1125	55 -3 634	64 10 725	64 10 465	73 7 321	64 -8 448
54 4 422	54 5 634	63 -5 637	63 -5 637	72 8 329	63 -4 675
53 3 2996	53 3 2996	62 6 1124	62 6 1124	71 8 343	62 12 476
52 -1 6066	52 -1 6066	61 -7 598	61 -7 598	70 3 370	61 -10 1356
51 F F	51 F F	60 -8 2997	60 -8 2997	69 -6 448	60 11 808
		59 R R	59 R R	68 6 476	59 10 811
				67 6 516	58 9 475
				66 23 440	57 5 1946
				65 R R	56 14 1179
					55 R R

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 70.00 LONG. = 100.00	GEOGRAPHIC LAT. = 70.00 LONG. = 195.00	GEOGRAPHIC LAT. = 70.00 LONG. = 210.00	GEOGRAPHIC LAT. = 70.00 LONG. = 225.00	GEOGRAPHIC LAT. = 70.00 LONG. = 240.00	GEOGRAPHIC LAT. = 70.00 LONG. = 255.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
10.00 34 196	11.00 37 -154	10.00 41 -143	10.00 46 -130	10.00 51 -114	10.00 55 -96
9.00 33 196	9.00 36 -153	9.00 40 -142	9.00 45 -129	9.00 50 -114	9.00 55 -96
8.00 32 196	8.00 35 -152	8.00 40 -141	8.00 44 -128	8.00 49 -114	8.00 54 -96
7.00 30 200	7.00 33 -150	7.00 37 -140	7.00 42 -126	7.00 48 -113	7.00 53 -96
6.00 24 201	6.00 24 -150	6.00 33 -140	6.00 39 -129	6.00 45 -114	6.00 51 -96
5.00 20 199	5.00 24 -152	5.00 30 -142	5.00 37 -131	5.00 44 -116	5.00 50 -97
4.00 17 200	4.00 22 -151	4.00 28 -141	4.00 35 -129	4.00 42 -115	4.00 48 -97
3.00 9 201	3.00 14 -151	3.00 22 -142	3.00 30 -131	3.00 38 -116	3.00 46 -98
2.00 -3 207	2.00 4 -147	2.00 12 -140	2.00 20 -130	2.00 28 -117	2.00 36 -99
1.00 -6 208	1.00 1 -147	1.00 11 -140	1.00 19 -131	1.00 27 -117	1.00 35 -99
0.00 -7 208	0.00 0 -147	0.00 10 -140	0.00 18 -131	0.00 26 -117	0.00 34 -99
1.00 -8 210	1.00 0 -146	1.00 9 -139	1.00 17 -130	1.00 25 -117	1.00 33 -99
1.00 -11 212	1.00 -3 -144	1.00 7 -139	1.00 15 -130	1.00 23 -117	1.00 31 -99
1.00 -13 213	1.00 -5 -144	1.00 6 -139	1.00 14 -131	1.00 22 -117	1.00 30 -99
1.00 -15 215	1.00 -7 -143	1.00 5 -138	1.00 13 -130	1.00 21 -117	1.00 29 -99
1.00 -17 218	1.00 -10 -141	1.00 4 -136	1.00 12 -130	1.00 20 -118	1.00 28 -100
1.00 -19 220	1.00 -12 -139	1.00 3 -137	1.00 11 -130	1.00 19 -118	1.00 27 -100
1.00 -21 222	1.00 -15 -137	1.00 2 -136	1.00 10 -130	1.00 18 -118	1.00 26 -100
1.00 -24 227	1.00 -18 -134	1.00 1 -135	1.00 9 -129	1.00 17 -118	1.00 25 -100
1.00 -27 234	1.00 -21 -129	0.00 -6 -135	0.00 6 -129	0.00 16 -117	0.00 24 -100
0.00 -30 244	0.00 -23 -129	0.00 -10 -133	0.00 3 -126	0.00 13 -117	0.00 21 -100
0.00 -33 256	0.00 -27 -122	0.00 -13 -131	0.00 0 -127	0.00 10 -117	0.00 18 -100
0.00 -36 269	0.00 -31 -111	0.00 -16 -127	0.00 -3 -127	0.00 7 -117	0.00 15 -100
0.00 -39 285	0.00 -35 -93	0.00 -20 -110	0.00 -7 -126	0.00 4 -117	0.00 12 -100
0.00 -42 306	0.00 -39 -62	0.00 -24 -101	0.00 -11 -123	0.00 1 -116	0.00 9 -100
0.00 -45 323	0.00 -43 -37	0.00 -28 -89	0.00 -15 -119	0.00 -2 -116	0.00 6 -100
0.00 -48 339	0.00 -47 -15	0.00 -31 -69	0.00 -19 -108	0.00 -6 -116	0.00 3 -100
0.00 -51 356	0.00 -51 -15	0.00 -35 -69	0.00 -23 -108	0.00 -10 -116	0.00 0 -100
0.00 -54 373	0.00 -55 -48	0.00 -39 -60	0.00 -27 -108	0.00 -14 -116	0.00 -3 -100
0.00 -57 390	0.00 -59 -37	0.00 -43 -51	0.00 -31 -108	0.00 -18 -116	0.00 -7 -100
0.00 -60 408	0.00 -63 -28	0.00 -47 -42	0.00 -35 -108	0.00 -22 -116	0.00 -11 -100
0.00 -63 425	0.00 -67 -19	0.00 -51 -33	0.00 -39 -108	0.00 -26 -116	0.00 -15 -100
0.00 -66 442	0.00 -71 -10	0.00 -55 -24	0.00 -43 -108	0.00 -30 -116	0.00 -19 -100
0.00 -69 459	0.00 -75 -1	0.00 -59 -15	0.00 -47 -108	0.00 -34 -116	0.00 -23 -100
0.00 -72 476	0.00 -79 -8	0.00 -63 -6	0.00 -51 -108	0.00 -38 -116	0.00 -27 -100
0.00 -75 493	0.00 -83 -1	0.00 -67 -3	0.00 -55 -108	0.00 -42 -116	0.00 -31 -100
0.00 -78 510	0.00 -87 -6	0.00 -71 -4	0.00 -59 -108	0.00 -46 -116	0.00 -35 -100
0.00 -81 527	0.00 -91 -13	0.00 -75 -11	0.00 -63 -108	0.00 -50 -116	0.00 -39 -100
0.00 -84 544	0.00 -95 -20	0.00 -79 -18	0.00 -67 -108	0.00 -54 -116	0.00 -43 -100
0.00 -87 561	0.00 -99 -27	0.00 -83 -25	0.00 -71 -108	0.00 -58 -116	0.00 -47 -100
0.00 -90 578	0.00 -103 -34	0.00 -87 -32	0.00 -75 -108	0.00 -62 -116	0.00 -51 -100
0.00 -93 595	0.00 -107 -41	0.00 -91 -39	0.00 -79 -108	0.00 -66 -116	0.00 -55 -100
0.00 -96 612	0.00 -111 -48	0.00 -95 -46	0.00 -83 -108	0.00 -70 -116	0.00 -59 -100
0.00 -99 629	0.00 -115 -55	0.00 -99 -53	0.00 -87 -108	0.00 -74 -116	0.00 -63 -100
0.00 -102 646	0.00 -119 -62	0.00 -103 -60	0.00 -91 -108	0.00 -78 -116	0.00 -67 -100
0.00 -105 663	0.00 -123 -69	0.00 -107 -67	0.00 -95 -108	0.00 -82 -116	0.00 -71 -100
0.00 -108 680	0.00 -127 -76	0.00 -111 -74	0.00 -99 -108	0.00 -86 -116	0.00 -75 -100
0.00 -111 697	0.00 -131 -83	0.00 -115 -81	0.00 -103 -108	0.00 -90 -116	0.00 -79 -100
0.00 -114 714	0.00 -135 -90	0.00 -119 -88	0.00 -107 -108	0.00 -94 -116	0.00 -83 -100
0.00 -117 731	0.00 -139 -97	0.00 -123 -95	0.00 -111 -108	0.00 -98 -116	0.00 -87 -100
0.00 -120 748	0.00 -143 -104	0.00 -127 -102	0.00 -115 -108	0.00 -102 -116	0.00 -91 -100
0.00 -123 765	0.00 -147 -111	0.00 -131 -109	0.00 -119 -108	0.00 -106 -116	0.00 -95 -100
0.00 -126 782	0.00 -151 -118	0.00 -135 -116	0.00 -123 -108	0.00 -110 -116	0.00 -99 -100
0.00 -129 799	0.00 -155 -125	0.00 -139 -123	0.00 -127 -108	0.00 -114 -116	0.00 -103 -100
0.00 -132 816	0.00 -159 -132	0.00 -143 -130	0.00 -131 -108	0.00 -118 -116	0.00 -107 -100
0.00 -135 833	0.00 -163 -139	0.00 -147 -137	0.00 -135 -108	0.00 -122 -116	0.00 -111 -100
0.00 -138 850	0.00 -167 -146	0.00 -151 -144	0.00 -139 -108	0.00 -126 -116	0.00 -115 -100
0.00 -141 867	0.00 -171 -153	0.00 -155 -151	0.00 -143 -108	0.00 -130 -116	0.00 -119 -100
0.00 -144 884	0.00 -175 -160	0.00 -159 -158	0.00 -147 -108	0.00 -134 -116	0.00 -123 -100
0.00 -147 901	0.00 -179 -167	0.00 -163 -165	0.00 -151 -108	0.00 -138 -116	0.00 -127 -100
0.00 -150 918	0.00 -183 -174	0.00 -167 -172	0.00 -155 -108	0.00 -142 -116	0.00 -131 -100
0.00 -153 935	0.00 -187 -181	0.00 -171 -179	0.00 -159 -108	0.00 -146 -116	0.00 -135 -100
0.00 -156 952	0.00 -191 -188	0.00 -175 -186	0.00 -163 -108	0.00 -150 -116	0.00 -139 -100
0.00 -159 969	0.00 -195 -195	0.00 -179 -193	0.00 -167 -108	0.00 -154 -116	0.00 -143 -100
0.00 -162 986	0.00 -199 -202	0.00 -183 -200	0.00 -171 -108	0.00 -158 -116	0.00 -147 -100
0.00 -165 1003	0.00 -203 -209	0.00 -187 -207	0.00 -175 -108	0.00 -162 -116	0.00 -151 -100
0.00 -168 1020	0.00 -207 -216	0.00 -191 -214	0.00 -179 -108	0.00 -166 -116	0.00 -155 -100
0.00 -171 1037	0.00 -211 -223	0.00 -195 -221	0.00 -183 -108	0.00 -170 -116	0.00 -159 -100
0.00 -174 1054	0.00 -215 -230	0.00 -199 -228	0.00 -187 -108	0.00 -174 -116	0.00 -163 -100
0.00 -177 1071	0.00 -219 -237	0.00 -203 -235	0.00 -191 -108	0.00 -178 -116	0.00 -167 -100
0.00 -180 1088	0.00 -223 -244	0.00 -207 -242	0.00 -195 -108	0.00 -182 -116	0.00 -171 -100
0.00 -183 1105	0.00 -227 -251	0.00 -211 -249	0.00 -199 -108	0.00 -186 -116	0.00 -175 -100
0.00 -186 1122	0.00 -231 -258	0.00 -215 -256	0.00 -203 -108	0.00 -190 -116	0.00 -179 -100
0.00 -189 1139	0.00 -235 -265	0.00 -219 -263	0.00 -207 -108	0.00 -194 -116	0.00 -183 -100
0.00 -192 1156	0.00 -239 -272	0.00 -223 -270	0.00 -211 -108	0.00 -198 -116	0.00 -187 -100
0.00 -195 1173	0.00 -243 -279	0.00 -227 -277	0.00 -215 -108	0.00 -202 -116	0.00 -191 -100
0.00 -198 1190	0.00 -247 -286	0.00 -231 -284	0.00 -219 -108	0.00 -206 -116	0.00 -195 -100
0.00 -201 1207	0.00 -251 -293	0.00 -235 -291	0.00 -223 -108	0.00 -210 -116	0.00 -199 -100
0.00 -204 1224	0.00 -255 -300	0.00 -239 -298	0.00 -227 -108	0.00 -214 -116	0.00 -203 -100
0.00 -207 1241	0.00 -259 -307	0.00 -243 -305	0.00 -231 -108	0.00 -218 -116	0.00 -207 -100
0.00 -210 1258	0.00 -263 -314	0.00 -247 -312	0.00 -235 -108	0.00 -222 -116	0.00 -211 -100
0.00 -213 1275	0.00 -267 -321	0.00 -251 -319	0.00 -239 -108	0.00 -226 -116	0.00 -215 -100
0.00 -216 1292	0.00 -271 -328	0.00 -255 -326	0.00 -243 -108	0.00 -230 -116	0.00 -219 -100
0.00 -219 1309	0.00 -275 -335	0.00 -259 -333	0.00 -247 -108	0.00 -234 -116	0.00 -223 -100
0.00 -222 1326	0.00 -279 -342	0.00 -263 -340	0.00 -251 -108	0.00 -238 -116	0.00 -227 -100
0.00 -225 1343	0.00 -283 -349	0.00 -267 -347	0.00 -255 -108	0.00 -242 -116	0.00 -231 -100
0.00 -228 1360	0.00 -287 -356	0.00 -271 -354	0.00 -259 -108	0.00 -246 -116	0.00 -235 -100
0.00 -231 1377	0.00 -291 -363	0.00 -275 -361	0.00 -263 -108	0.00 -250 -116	0.00 -239 -100
0.00 -234 1394	0.00 -295 -370	0.00 -279 -368	0.00 -267 -108	0.00 -254 -116	0.00 -243 -100
0.00 -237 1411	0.00 -299 -377	0.00 -283 -375	0.00 -271 -108	0.00 -258 -116	0.00 -247 -100
0.00 -240 1428	0.00 -303 -384	0.00 -287 -382	0.00 -275 -108	0.00 -262 -116	0.00 -251 -100
0.00 -243 1445	0.00 -307 -391	0.00 -291 -389	0.00 -279 -108	0.00 -266 -116	0.00 -255 -100
0.00 -246 1462	0.00 -311 -398	0.00 -295 -396	0.00 -283 -108	0.00 -270 -116	0.00 -259 -100
0.00 -249 1479	0.00 -315 -405	0.00 -299 -403	0.00 -287 -108	0.00 -274 -116	0.00 -263 -100
0.00 -252 1496	0.00 -319 -412	0.00 -303 -410	0.00 -291 -108	0.00 -278 -116	0.00 -267 -100
0.00 -255 1513	0.00 -323 -419	0.00 -307 -417	0.00 -295 -108	0.00 -282 -116	0.00 -271 -100
0.00 -258 1530	0.00 -327 -426	0.00 -311 -424	0.00 -299 -108	0.00 -286 -116	0.00 -275 -100
0.00 -261 1547	0.00 -331 -433	0.00 -315 -431	0.00 -303 -108	0.00 -290 -116	0.00 -279 -100
0.00 -264 1564	0.00 -335 -440	0.00 -319 -438	0.00 -307 -108	0.00 -294 -116	0.00 -283 -100
0.00 -267 1581	0.00 -339 -447	0.00 -323 -445	0.00 -311 -108	0.00 -298 -116	0.00 -287 -100
0.00 -270 1598	0.00 -343 -454	0.00 -327 -452	0.00 -315 -108	0.00 -302 -116	0.00 -291 -100
0.00 -273 1615	0.00 -347 -461	0.00 -331 -459	0.00 -319 -108	0.00 -306 -116	0.00 -295 -100
0.00 -276 1632	0.00 -351 -468	0.00 -335 -466	0.00 -323 -108	0.00 -310 -116	0.00 -299 -100
0.00 -279 1649	0.00 -355 -475	0.00 -339 -473	0.00 -327 -108	0.00 -314 -116	0.00 -303 -100
0.00 -282 1666	0.00 -359 -482	0.00 -343 -480	0.00 -331 -108	0.00 -318 -116	0.00 -307 -100
0.00 -285 1683	0.00 -363 -489	0.00 -347 -487	0.00 -335 -108	0.00 -322 -116	0.00 -311 -100
0.00 -288 1700	0.00 -367 -496	0.00 -351 -494	0.00 -339 -108	0.00 -326 -116	0.00 -315 -100
0.00 -291 1717	0.00 -371 -503	0.00 -355 -501	0.00 -343 -108	0.00 -330 -116	0.00 -319 -100
0.00 -294 1734	0.00 -375 -510	0.00 -359 -508	0.00 -347 -108	0.00 -334 -116	0.00 -323 -100
0.00 -297 1751	0.00 -379 -517	0.00 -363 -515	0.00 -351 -108	0.00 -338 -116	0.00 -327 -100
0.00 -300 1768	0.00 -383 -524	0.00 -367 -522	0.00 -355 -108	0.00 -342 -116	0.00 -331 -100
0.00 -303 1785	0.00 -387 -531	0.00 -371 -529	0.00 -359 -108	0.00 -346 -116	0.00 -335 -100
0.00 -306 1802	0.00 -391 -538	0.00 -375 -536	0.00 -363 -108	0.00 -350 -116	0.00 -339 -100
0.00 -309 1819	0.00 -395 -545	0.00 -379 -543	0.00 -367 -108	0.00 -354 -116	0.00 -343 -100
0.00 -312 1836	0.00 -399 -55				

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC (GV) LAT LONG	GEOGRAPHIC LAT. = 70.00 LONG. = 270.00	GEOGRAPHIC (GV) LAT LONG	GEOGRAPHIC LAT. = 70.00 LONG. = 285.00	GEOGRAPHIC (GV) LAT LONG	GEOGRAPHIC LAT. = 70.00 LONG. = 100.00	GEOGRAPHIC (GV) LAT LONG	GEOGRAPHIC LAT. = 70.00 LONG. = 315.00	GEOGRAPHIC (GV) LAT LONG	GEOGRAPHIC LAT. = 70.00 LONG. = 330.00	GEOGRAPHIC (GV) LAT LONG	GEOGRAPHIC LAT. = 70.00 LONG. = 345.00
10.00 56 -74	10.00 56 -74	10.00 55 -51	10.00 55 -51	10.00 56 -29	10.00 56 -29	10.00 54 -10	10.00 54 -10	10.00 50 7	10.00 50 7	10.00 47 22	10.00 47 22
9.00 57 -75	9.00 57 -75	9.00 56 -52	9.00 56 -52	9.00 57 -30	9.00 57 -30	9.00 54 -10	9.00 54 -10	9.00 51 9	9.00 51 9	9.00 48 23	9.00 48 23
8.00 57 -75	8.00 57 -75	9.00 56 -51	9.00 56 -51	9.00 57 -29	9.00 57 -29	8.00 54 -8	8.00 54 -8	8.00 51 9	8.00 51 9	8.00 48 23	8.00 48 23
7.00 56 -74	7.00 56 -74	7.00 54 -50	7.00 54 -50	7.00 56 -26	7.00 56 -26	7.00 53 -5	7.00 53 -5	7.00 50 12	7.00 50 12	7.00 46 20	7.00 46 20
6.00 55 -74	6.00 55 -74	5.00 56 -48	5.00 56 -48	6.00 54 -24	6.00 54 -24	6.00 50 -3	6.00 50 -3	6.00 46 15	6.00 46 15	6.00 42 30	6.00 42 30
5.00 54 -74	5.00 54 -74	5.00 54 -56	5.00 54 -56	5.00 52 -26	5.00 52 -26	5.00 46 -5	5.00 46 -5	5.00 43 13	5.00 43 13	5.00 38 23	5.00 38 23
4.00 53 -75	4.00 53 -75	4.00 54 -49	4.00 54 -49	5.00 52 -25	5.00 52 -25	4.00 48 -4	4.00 48 -4	4.00 43 15	4.00 43 15	4.00 37 31	4.00 37 31
3.00 53 -75	3.00 53 -75	4.00 51 -50	4.00 51 -50	3.00 48 -25	3.00 48 -25	3.00 43 -3	3.00 43 -3	3.00 37 20	3.00 37 20	3.00 32 32	3.00 32 32
2.00 47 -75	2.00 47 -75	3.00 49 -48	3.00 49 -48	2.00 48 -22	2.00 48 -22	2.00 39 1	2.00 39 1	2.00 32 20	2.00 32 20	2.00 26 37	2.00 26 37
1.00 46 -75	1.00 46 -75	1.00 47 -48	1.00 47 -48	1.00 44 -22	1.00 44 -22	1.00 36 1	1.00 36 1	1.00 31 20	1.00 31 20	1.00 24 38	1.00 24 38
1.00 46 -75	1.00 46 -75	1.00 47 -49	1.00 47 -49	1.00 44 -23	1.00 44 -23	1.00 37 360	1.00 37 360	1.00 30 20	1.00 30 20	1.00 23 38	1.00 23 38
1.00 45 -75	1.00 45 -75	1.00 46 -48	1.00 46 -48	1.00 42 -22	1.00 42 -22	1.00 36 2	1.00 36 2	1.00 28 22	1.00 28 22	1.00 21 40	1.00 21 40
1.00 45 -75	1.00 45 -75	1.00 45 -48	1.00 45 -48	1.00 42 -22	1.00 42 -22	1.00 35 1	1.00 35 1	1.00 27 21	1.00 27 21	1.00 19 40	1.00 19 40
1.00 45 -75	1.00 45 -75	1.00 45 -45	1.00 45 -45	1.00 41 -21	1.00 41 -21	1.00 35 2	1.00 35 2	1.00 27 22	1.00 27 22	1.00 19 41	1.00 19 41
1.00 45 -75	1.00 45 -75	1.00 44 -46	1.00 44 -46	1.00 40 -21	1.00 40 -21	1.00 34 3	1.00 34 3	1.00 26 24	1.00 26 24	1.00 18 42	1.00 18 42
1.00 42 -75	1.00 42 -75	1.00 44 -47	1.00 44 -47	1.00 40 -20	1.00 40 -20	1.00 32 3	1.00 32 3	1.00 22 24	1.00 22 24	1.00 15 43	1.00 15 43
1.00 41 -76	1.00 41 -76	1.00 43 -48	1.00 43 -48	1.00 39 -21	1.00 39 -21	1.00 31 3	1.00 31 3	1.00 19 26	1.00 19 26	1.00 13 44	1.00 13 44
1.00 41 -76	1.00 41 -76	1.00 42 -48	1.00 42 -48	1.00 37 -20	1.00 37 -20	1.00 29 4	1.00 29 4	1.00 17 27	1.00 17 27	1.00 10 46	1.00 10 46
1.00 40 -76	1.00 40 -76	1.00 41 -49	1.00 41 -49	1.00 36 -20	1.00 36 -20	1.00 27 4	1.00 27 4	1.00 15 28	1.00 15 28	1.00 8 48	1.00 8 48
1.00 39 -76	1.00 39 -76	1.00 40 -47	1.00 40 -47	1.00 35 -20	1.00 35 -20	1.00 26 5	1.00 26 5	1.00 13 30	1.00 13 30	1.00 5 50	1.00 5 50
1.00 37 -76	1.00 37 -76	1.00 36 -47	1.00 36 -47	1.00 33 -19	1.00 33 -19	1.00 23 7	1.00 23 7	1.00 9 32	1.00 9 32	1.00 2 54	1.00 2 54
1.00 35 -76	1.00 35 -76	1.00 37 -47	1.00 37 -47	1.00 31 -19	1.00 31 -19	1.00 21 7	1.00 21 7	1.00 5 35	1.00 5 35	1.00 2 58	1.00 2 58
1.00 33 -76	1.00 33 -76	1.00 32 -47	1.00 32 -47	1.00 28 -18	1.00 28 -18	1.00 17 9	1.00 17 9	1.00 3 35	1.00 3 35	1.00 2 58	1.00 2 58
1.00 31 -77	1.00 31 -77	1.00 32 -47	1.00 32 -47	1.00 25 -17	1.00 25 -17	1.00 13 11	1.00 13 11	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 27 -77	1.00 27 -77	1.00 21 -47	1.00 21 -47	1.00 20 -16	1.00 20 -16	1.00 7 14	1.00 7 14	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 22 -78	1.00 22 -78	1.00 24 -47	1.00 24 -47	1.00 14 -15	1.00 14 -15	1.00 2 19	1.00 2 19	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 13 -80	1.00 13 -80	1.00 14 -48	1.00 14 -48	1.00 1 -12	1.00 1 -12	1.00 21 38	1.00 21 38	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 12 -81	1.00 12 -81	1.00 12 -48	1.00 12 -48	1.00 1 -11	1.00 1 -11	1.00 23 40	1.00 23 40	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 9 -81	1.00 9 -81	1.00 11 -48	1.00 11 -48	1.00 1 -12	1.00 1 -12	1.00 26 53	1.00 26 53	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 6 -82	1.00 6 -82	1.00 11 -49	1.00 11 -49	1.00 1 -11	1.00 1 -11	1.00 27 65	1.00 27 65	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 4 -82	1.00 4 -82	1.00 7 -49	1.00 7 -49	1.00 1 -10	1.00 1 -10	1.00 24 84	1.00 24 84	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 4 -84	1.00 4 -84	1.00 5 -50	1.00 5 -50	1.00 1 -10	1.00 1 -10	1.00 24 84	1.00 24 84	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 2 -84	1.00 2 -84	1.00 2 -51	1.00 2 -51	1.00 1 -10	1.00 1 -10	1.00 24 84	1.00 24 84	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 2 -87	1.00 2 -87	1.00 0 -53	1.00 0 -53	1.00 1 -10	1.00 1 -10	1.00 24 84	1.00 24 84	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 2 -89	1.00 2 -89	1.00 0 -55	1.00 0 -55	1.00 1 -10	1.00 1 -10	1.00 24 84	1.00 24 84	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 1 -89	1.00 1 -89	1.00 0 -59	1.00 0 -59	1.00 1 -10	1.00 1 -10	1.00 24 84	1.00 24 84	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58
1.00 1 -89	1.00 1 -89	1.00 0 -59	1.00 0 -59	1.00 1 -10	1.00 1 -10	1.00 24 84	1.00 24 84	1.00 1 40	1.00 1 40	1.00 2 58	1.00 2 58

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = 65.00			LAT. = 65.00			LAT. = 65.00			LAT. = 65.00			LAT. = 65.00		
LONG. = 8.00			LONG. = 15.00			LONG. = 30.00			LONG. = 45.00			LONG. = 60.00		
RIG ASYMPTOTIC			RIG ASYMPTOTIC			RIG ASYMPTOTIC			RIG ASYMPTOTIC			RIG ASYMPTOTIC		
(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG
10.00	33	30	10.00	31	52	12.00	31	66	10.00	30	80	10.00	30	95
9.00	33	30	7.68	31	53	9.00	30	67	9.00	29	81	9.00	29	96
8.00	32	40	3.08	30	55	8.00	29	69	8.00	28	81	8.00	26	98
7.00	30	44	7.08	29	58	7.00	28	72	7.00	28	87	7.00	24	101
6.00	25	47	5.00	23	62	6.00	21	75	6.00	19	89	6.00	16	103
5.00	20	47	5.08	17	62	5.08	15	76	5.00	14	90	5.00	13	104
4.00	18	49	4.00	15	65	4.00	13	79	4.00	11	94	4.00	10	109
3.00	9	55	3.00	7	71	3.00	3	87	3.00	2	101	3.00	0	116
2.00	1	65	2.00	-3	85	2.00	-6	103	2.00	-8	121	2.00	-10	117
1.00	-1	60	1.00	-5	88	1.00	-8	107	1.00	-10	125	2.00	-11	119
1.00	-3	70	1.00	-7	91	1.00	-10	114	1.00	-11	133	2.70	-2	121
1.00	-4	72	1.00	-8	94	1.00	-10	114	1.00	-11	139	2.60	-3	123
1.50	-7	79	1.50	-10	103	1.50	-11	127	1.50	-11	148	2.50	-5	125
1.00	-8	82	1.00	-10	108	1.00	-10	132	1.40	-9	155	2.40	-7	127
1.00	-9	87	1.00	-10	115	1.00	-9	143	1.30	-8	169	2.30	-8	129
1.20	-10	92	1.20	-9	124	1.20	-9	155	1.20	-8	183	2.00	-10	137
1.00	-11	101	1.00	-6	137	1.00	-5	175	1.00	-4	216	2.00	-10	137
1.00	-9	110	1.00	0	152	1.00	12	205	1.00	11	220	1.90	-12	142
0.00	-6	123	0.00	11	160	0.00	13	328	1.00	12	224	1.80	-13	146
0.00	2	144	0.00	13	165	0.00	16	440	1.00	12	229	1.70	-12	151
0.00	16	194	0.00	16	192	0.00	19	440	1.00	12	233	1.60	-13	158
0.00	17	204	0.00	16	201	0.00	19	430	1.00	11	239	1.50	-12	168
0.00	14	215	0.00	16	210	0.00	18	654	1.00	10	246	1.40	-9	176
0.00	5	235	0.00	15	219	0.00	-2	681	1.00	7	255	1.30	-4	193
0.00	-27	288	0.00	12	228	0.00	7	476	1.00	1	268	1.20	3	211
0.00	-7	374	0.00	8	237	0.00	8	739	1.00	-12	289	1.10	7	264
0.00	-8	524	0.00	0	250	0.00	8	739	1.00	-21	356	1.00	4	272
0.00	11	621	0.00	-16	274	0.00	-18	654	0.98	-19	459	1.00	-1	281
0.00	-12	642	0.00	-1	306	0.00	-18	654	0.97	17	475	1.00	-7	293
0.00	-13	642	0.00	13	522	0.00	-18	654	0.96	-3	612	1.00	-17	312
0.00	-14	642	0.00	-2	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-15	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-16	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-17	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-18	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-19	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-20	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-21	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-22	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-23	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-24	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-25	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-26	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-27	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-28	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-29	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-30	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-31	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-32	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-33	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-34	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-35	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-36	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-37	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-38	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-39	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-40	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-41	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-42	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-43	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-44	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-45	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-46	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-47	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-48	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-49	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-50	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-51	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-52	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-53	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-54	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-55	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-56	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-57	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-58	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-59	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-60	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-61	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312
0.00	-62	642	0.00	-1	441	0.00	-18	654	0.95	-3	612	1.00	-17	312

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 65.00 LONG. = 90.00		GEOGRAPHIC LAT. = 65.00 LONG. = 120.00		GEOGRAPHIC LAT. = 65.00 LONG. = 150.00		GEOGRAPHIC LAT. = 65.00 LONG. = 185.00	
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
18.00 20 126	17.00 26 141	18.00 22 156	18.00 19 169	18.00 17 181	18.00 17 191	18.00 17 191	18.00 17 191
9.00 27 127	9.00 24 142	9.00 21 156	9.00 18 170	9.00 17 181	9.00 16 191	9.00 16 191	9.00 16 191
6.00 25 129	6.00 21 144	6.00 20 158	6.00 17 171	6.00 16 183	6.00 16 193	6.00 16 193	6.00 16 193
7.00 21 131	7.00 19 146	7.00 17 161	7.00 14 174	7.00 13 186	7.00 12 196	7.00 12 196	7.00 12 196
6.00 16 133	6.00 13 148	6.00 11 163	6.00 8 177	6.00 6 189	6.00 5 199	6.00 5 199	6.00 5 199
5.00 11 134	5.00 8 150	5.00 6 165	5.00 4 178	5.00 2 190	5.00 0 200	5.00 0 200	5.00 0 200
4.00 6 139	4.00 3 154	4.00 0 169	4.00 0 184	4.00 0 194	4.00 0 204	4.00 0 204	4.00 0 204
3.00 4 147	3.00 1 163	3.00 0 179	3.00 0 194	3.00 0 206	3.00 0 214	3.00 0 214	3.00 0 214
2.00 15 171	2.00 0 164	2.00 0 180	2.00 0 195	2.00 0 207	2.00 0 215	2.00 0 215	2.00 0 215
1.00 17 176	1.00 0 166	2.00 0 182	2.00 0 197	2.00 0 209	2.00 0 216	2.00 0 216	2.00 0 216
1.00 16 181	1.00 0 168	2.00 0 184	2.00 0 199	2.00 0 211	2.00 0 218	2.00 0 218	2.00 0 218
1.00 16 187	1.00 0 170	2.00 0 187	2.00 0 202	2.00 0 214	2.00 0 221	2.00 0 221	2.00 0 221
1.00 16 197	1.00 0 173	2.00 0 190	2.00 0 206	2.00 0 216	2.00 0 223	2.00 0 223	2.00 0 223
1.00 13 207	1.00 0 175	2.00 0 193	2.00 0 210	2.00 0 218	2.00 0 225	2.00 0 225	2.00 0 225
1.00 9 228	1.00 0 178	2.00 0 196	2.00 0 213	2.00 0 220	2.00 0 227	2.00 0 227	2.00 0 227
1.00 6 242	1.00 0 181	2.00 0 199	2.00 0 217	2.00 0 223	2.00 0 230	2.00 0 230	2.00 0 230
1.00 6 279	1.00 0 184	2.00 0 203	2.00 0 221	2.00 0 227	2.00 0 234	2.00 0 234	2.00 0 234
1.00 5 288	1.00 0 189	2.00 0 209	2.00 0 227	2.00 0 234	2.00 0 241	2.00 0 241	2.00 0 241
1.00 3 298	1.00 0 196	2.00 0 216	2.00 0 236	2.00 0 243	2.00 0 250	2.00 0 250	2.00 0 250
1.00 2 311	1.00 0 202	2.00 0 224	2.00 0 245	2.00 0 252	2.00 0 259	2.00 0 259	2.00 0 259
1.00 10 330	1.00 0 208	2.00 0 231	2.00 0 253	2.00 0 260	2.00 0 267	2.00 0 267	2.00 0 267
1.00 19 367	1.00 0 219	2.00 0 244	2.00 0 267	2.00 0 274	2.00 0 281	2.00 0 281	2.00 0 281
1.00 4 788	1.00 0 231	2.00 0 259	2.00 0 288	2.00 0 305	2.00 0 312	2.00 0 312	2.00 0 312
1.00 5 856	1.00 0 246	2.00 0 274	2.00 0 305	2.00 0 322	2.00 0 329	2.00 0 329	2.00 0 329
1.00 11 482	1.00 0 277	2.00 0 305	2.00 0 337	2.00 0 354	2.00 0 361	2.00 0 361	2.00 0 361
1.00 17 388	1.00 0 301	2.00 0 329	2.00 0 361	2.00 0 388	2.00 0 395	2.00 0 395	2.00 0 395
1.00 19 417	1.00 0 306	2.00 0 334	2.00 0 366	2.00 0 393	2.00 0 400	2.00 0 400	2.00 0 400
1.00 20 417	1.00 0 311	2.00 0 339	2.00 0 371	2.00 0 405	2.00 0 412	2.00 0 412	2.00 0 412
1.00 20 417	1.00 0 316	2.00 0 344	2.00 0 376	2.00 0 410	2.00 0 417	2.00 0 417	2.00 0 417
1.00 20 417	1.00 0 321	2.00 0 349	2.00 0 381	2.00 0 415	2.00 0 422	2.00 0 422	2.00 0 422
1.00 20 417	1.00 0 326	2.00 0 354	2.00 0 386	2.00 0 420	2.00 0 427	2.00 0 427	2.00 0 427
1.00 20 417	1.00 0 331	2.00 0 359	2.00 0 391	2.00 0 425	2.00 0 432	2.00 0 432	2.00 0 432
1.00 20 417	1.00 0 336	2.00 0 364	2.00 0 396	2.00 0 430	2.00 0 437	2.00 0 437	2.00 0 437
1.00 20 417	1.00 0 341	2.00 0 369	2.00 0 401	2.00 0 435	2.00 0 442	2.00 0 442	2.00 0 442
1.00 20 417	1.00 0 346	2.00 0 374	2.00 0 406	2.00 0 440	2.00 0 447	2.00 0 447	2.00 0 447
1.00 20 417	1.00 0 351	2.00 0 379	2.00 0 411	2.00 0 445	2.00 0 452	2.00 0 452	2.00 0 452
1.00 20 417	1.00 0 356	2.00 0 384	2.00 0 416	2.00 0 450	2.00 0 457	2.00 0 457	2.00 0 457
1.00 20 417	1.00 0 361	2.00 0 389	2.00 0 421	2.00 0 455	2.00 0 462	2.00 0 462	2.00 0 462
1.00 20 417	1.00 0 366	2.00 0 394	2.00 0 426	2.00 0 460	2.00 0 467	2.00 0 467	2.00 0 467
1.00 20 417	1.00 0 371	2.00 0 399	2.00 0 431	2.00 0 465	2.00 0 472	2.00 0 472	2.00 0 472
1.00 20 417	1.00 0 376	2.00 0 404	2.00 0 436	2.00 0 470	2.00 0 477	2.00 0 477	2.00 0 477
1.00 20 417	1.00 0 381	2.00 0 409	2.00 0 441	2.00 0 475	2.00 0 482	2.00 0 482	2.00 0 482
1.00 20 417	1.00 0 386	2.00 0 414	2.00 0 446	2.00 0 480	2.00 0 487	2.00 0 487	2.00 0 487
1.00 20 417	1.00 0 391	2.00 0 419	2.00 0 451	2.00 0 485	2.00 0 492	2.00 0 492	2.00 0 492
1.00 20 417	1.00 0 396	2.00 0 424	2.00 0 456	2.00 0 490	2.00 0 497	2.00 0 497	2.00 0 497
1.00 20 417	1.00 0 401	2.00 0 429	2.00 0 461	2.00 0 495	2.00 0 502	2.00 0 502	2.00 0 502
1.00 20 417	1.00 0 406	2.00 0 434	2.00 0 466	2.00 0 500	2.00 0 507	2.00 0 507	2.00 0 507
1.00 20 417	1.00 0 411	2.00 0 439	2.00 0 471	2.00 0 505	2.00 0 512	2.00 0 512	2.00 0 512
1.00 20 417	1.00 0 416	2.00 0 444	2.00 0 476	2.00 0 510	2.00 0 517	2.00 0 517	2.00 0 517
1.00 20 417	1.00 0 421	2.00 0 449	2.00 0 481	2.00 0 515	2.00 0 522	2.00 0 522	2.00 0 522
1.00 20 417	1.00 0 426	2.00 0 454	2.00 0 486	2.00 0 520	2.00 0 527	2.00 0 527	2.00 0 527
1.00 20 417	1.00 0 431	2.00 0 459	2.00 0 491	2.00 0 525	2.00 0 532	2.00 0 532	2.00 0 532
1.00 20 417	1.00 0 436	2.00 0 464	2.00 0 496	2.00 0 530	2.00 0 537	2.00 0 537	2.00 0 537
1.00 20 417	1.00 0 441	2.00 0 469	2.00 0 501	2.00 0 535	2.00 0 542	2.00 0 542	2.00 0 542
1.00 20 417	1.00 0 446	2.00 0 474	2.00 0 506	2.00 0 540	2.00 0 547	2.00 0 547	2.00 0 547
1.00 20 417	1.00 0 451	2.00 0 479	2.00 0 511	2.00 0 545	2.00 0 552	2.00 0 552	2.00 0 552
1.00 20 417	1.00 0 456	2.00 0 484	2.00 0 516	2.00 0 550	2.00 0 557	2.00 0 557	2.00 0 557
1.00 20 417	1.00 0 461	2.00 0 489	2.00 0 521	2.00 0 555	2.00 0 562	2.00 0 562	2.00 0 562
1.00 20 417	1.00 0 466	2.00 0 494	2.00 0 526	2.00 0 560	2.00 0 567	2.00 0 567	2.00 0 567
1.00 20 417	1.00 0 471	2.00 0 499	2.00 0 531	2.00 0 565	2.00 0 572	2.00 0 572	2.00 0 572
1.00 20 417	1.00 0 476	2.00 0 504	2.00 0 536	2.00 0 570	2.00 0 577	2.00 0 577	2.00 0 577
1.00 20 417	1.00 0 481	2.00 0 509	2.00 0 541	2.00 0 575	2.00 0 582	2.00 0 582	2.00 0 582
1.00 20 417	1.00 0 486	2.00 0 514	2.00 0 546	2.00 0 580	2.00 0 587	2.00 0 587	2.00 0 587
1.00 20 417	1.00 0 491	2.00 0 519	2.00 0 551	2.00 0 585	2.00 0 592	2.00 0 592	2.00 0 592
1.00 20 417	1.00 0 496	2.00 0 524	2.00 0 556	2.00 0 590	2.00 0 597	2.00 0 597	2.00 0 597
1.00 20 417	1.00 0 501	2.00 0 529	2.00 0 561	2.00 0 595	2.00 0 602	2.00 0 602	2.00 0 602
1.00 20 417	1.00 0 506	2.00 0 534	2.00 0 566	2.00 0 600	2.00 0 607	2.00 0 607	2.00 0 607
1.00 20 417	1.00 0 511	2.00 0 539	2.00 0 571	2.00 0 605	2.00 0 612	2.00 0 612	2.00 0 612
1.00 20 417	1.00 0 516	2.00 0 544	2.00 0 576	2.00 0 610	2.00 0 617	2.00 0 617	2.00 0 617
1.00 20 417	1.00 0 521	2.00 0 549	2.00 0 581	2.00 0 615	2.00 0 622	2.00 0 622	2.00 0 622
1.00 20 417	1.00 0 526	2.00 0 554	2.00 0 586	2.00 0 620	2.00 0 627	2.00 0 627	2.00 0 627
1.00 20 417	1.00 0 531	2.00 0 559	2.00 0 591	2.00 0 625	2.00 0 632	2.00 0 632	2.00 0 632
1.00 20 417	1.00 0 536	2.00 0 564	2.00 0 596	2.00 0 630	2.00 0 637	2.00 0 637	2.00 0 637
1.00 20 417	1.00 0 541	2.00 0 569	2.00 0 601	2.00 0 635	2.00 0 642	2.00 0 642	2.00 0 642
1.00 20 417	1.00 0 546	2.00 0 574	2.00 0 606	2.00 0 640	2.00 0 647	2.00 0 647	2.00 0 647
1.00 20 417	1.00 0 551	2.00 0 579	2.00 0 611	2.00 0 645	2.00 0 652	2.00 0 652	2.00 0 652
1.00 20 417	1.00 0 556	2.00 0 584	2.00 0 616	2.00 0 650	2.00 0 657	2.00 0 657	2.00 0 657
1.00 20 417	1.00 0 561	2.00 0 589	2.00 0 621	2.00 0 655	2.00 0 662	2.00 0 662	2.00 0 662
1.00 20 417	1.00 0 566	2.00 0 594	2.00 0 626	2.00 0 660	2.00 0 667	2.00 0 667	2.00 0 667
1.00 20 417	1.00 0 571	2.00 0 599	2.00 0 631	2.00 0 665	2.00 0 672	2.00 0 672	2.00 0 672
1.00 20 417	1.00 0 576	2.00 0 604	2.00 0 636	2.00 0 670	2.00 0 677	2.00 0 677	2.00 0 677
1.00 20 417	1.00 0 581	2.00 0 609	2.00 0 641	2.00 0 675	2.00 0 682	2.00 0 682	2.00 0 682
1.00 20 417	1.00 0 586	2.00 0 614	2.00 0 646	2.00 0 680	2.00 0 687	2.00 0 687	2.00 0 687
1.00 20 417	1.00 0 591	2.00 0 619	2.00 0 651	2.00 0 685	2.00 0 692	2.00 0 692	2.00 0 692
1.00 20 417	1.00 0 596	2.00 0 624	2.00 0 656	2.00 0 690	2.00 0 697	2.00 0 697	2.00 0 697
1.00 20 417	1.00 0 601	2.00 0 629	2.00 0 661	2.00 0 695	2.00 0 702	2.00 0 702	2.00 0 702
1.00 20 417	1.00 0 606	2.00 0 634	2.00 0 666	2.00 0 700	2.00 0 707	2.00 0 707	2.00 0 707
1.00 20 417	1.00 0 611	2.00 0 639	2.00 0 671	2.00 0 705	2.00 0 712	2.00 0 712	2.00 0 712
1.00 20 417	1.00 0 616	2.00 0 644	2.00 0 676	2.00 0 710	2.00 0 717	2.00 0 717	2.00 0 717
1.00 20 417	1.00 0 621	2.00 0 649	2.00 0 681	2.00 0 715	2.00 0 722	2.00 0 722	2.00 0 722
1.00 20 417	1.00 0 626	2.00 0 654	2.00 0 686	2.00 0 720	2.00 0 727	2.00 0 727	2.00 0 727
1.00 20 417	1.00 0 631	2.00 0 659	2.00 0 691	2.00 0 725	2.00 0 732	2.00 0 732	2.00 0 732
1.00 20 417	1.00 0 636	2.00 0 664	2.00 0 696	2.00 0 730	2.00 0 737	2.00 0 737	2.00 0 737
1.00 20 417	1.00 0 641	2.00 0 669	2.00 0 701	2.00 0 735	2.00 0 742	2.00 0 742	2.00 0 742
1.00 20 417	1.00 0 646	2.00 0					

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

TABLE A: (CONTINUED)

[illegible]

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IPGCM 1975.0)

GEOGRAPHIC LAT. = 60.00 LONG. = 0.00	GEOGRAPHIC LAT. = 60.00 LONG. = 15.00	GEOGRAPHIC LAT. = 60.00 LONG. = 30.00	GEOGRAPHIC LAT. = 60.00 LONG. = 45.00	GEOGRAPHIC LAT. = 60.00 LONG. = 60.00	GEOGRAPHIC LAT. = 60.00 LONG. = 75.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
10.00 20 42	11.00 14 54	10.00 17 70	10.00 17 84	10.00 17 99	10.00 16 119
9.00 20 42	11.00 14 57	9.00 17 71	9.00 17 86	9.00 16 101	9.00 15 116
8.00 19 46	9.00 17 59	8.00 16 71	8.00 15 89	8.00 14 104	8.00 13 119
7.00 18 48	7.00 15 63	7.00 13 76	7.00 12 91	7.00 11 108	7.00 9 121
6.00 12 53	5.00 9 69	6.00 7 84	6.00 5 98	6.00 4 113	6.00 2 126
5.00 4 57	5.00 1 73	5.00 -1 88	5.00 -2 103	5.00 -3 118	5.00 -4 133
4.00 2 60	4.00 -1 76	4.00 -3 94	4.00 -4 110	4.00 -6 126	4.00 -8 142
3.00 -8 74	3.00 -10 95	3.00 -11 115	3.00 -12 132	3.00 -13 149	3.00 -14 167
2.00 -8 79	2.00 -10 97	2.00 -11 117	2.00 -11 134	2.00 -12 152	2.00 -13 169
2.00 -8 76	2.00 -10 99	2.00 -10 119	2.00 -11 137	2.00 -12 155	2.00 -13 173
2.70 -8 78	2.70 -10 100	2.70 -10 121	2.70 -11 140	2.70 -12 159	2.70 -13 178
2.60 -8 80	2.60 -10 103	2.60 -10 125	2.60 -11 145	2.60 -12 164	2.60 -13 186
2.50 -8 81	2.50 -10 107	2.50 -10 130	2.50 -11 151	2.50 -12 171	2.50 -13 192
2.40 -10 87	2.40 -10 112	2.40 -10 136	2.40 -11 154	2.40 -12 174	2.40 -13 201
2.38 -11 92	2.38 -11 119	2.38 -11 144	2.38 -12 167	2.38 -13 188	2.38 -14 210
2.30 -11 96	2.30 -11 124	2.30 -11 151	2.30 -12 174	2.30 -13 197	2.30 -14 220
2.10 -11 99	2.10 -12 129	2.10 -12 157	2.10 -13 182	2.10 -14 206	2.10 -15 232
2.00 -9 102	2.00 -12 134	2.00 -12 164	2.00 -13 193	2.00 -14 222	2.00 -15 256
1.90 -9 108	1.90 -12 142	1.90 -12 177	1.90 -13 214	1.90 -14 249	1.90 -15 291
1.80 -8 117	1.80 -12 156	1.80 -13 202	1.80 -14 238	1.80 -15 287	1.80 -16 338
1.70 -4 126	1.70 11 174	1.70 5 249	1.70 -6 278	1.70 14 331	1.70 28 384
1.60 0 133	1.60 15 193	1.60 1 255	1.60 -15 297	1.60 16 444	1.60 32 500
1.50 9 148	1.50 -4 256	1.50 -3 262	1.50 -25 315	1.50 18 464	1.50 36 520
1.40 16 174	1.40 -13 352	1.40 -9 271	1.40 -14 307	1.40 20 501	1.40 38 540
1.30 18 222	1.30 -13 352	1.30 -9 271	1.30 -14 307	1.30 20 501	1.30 38 540
1.20 18 222	1.20 -14 373	1.20 -14 373	1.20 -14 373	1.20 20 501	1.20 38 540
1.20 4 234	1.20 -10 334	1.20 -10 334	1.20 -10 334	1.20 20 501	1.20 38 540
1.20 -7 250	1.20 -4 351	1.20 -4 351	1.20 -4 351	1.20 20 501	1.20 38 540
1.20 -26 300	1.20 15 608	1.20 15 608	1.20 15 608	1.20 20 501	1.20 38 540
1.20 1 476	1.20 1 476	1.20 1 476	1.20 1 476	1.20 20 501	1.20 38 540
1.20 -14 387	1.20 -14 387	1.20 -14 387	1.20 -14 387	1.20 20 501	1.20 38 540
1.20 -4 649	1.20 -4 649	1.20 -4 649	1.20 -4 649	1.20 20 501	1.20 38 540
1.20 9 384	1.20 9 384	1.20 9 384	1.20 9 384	1.20 20 501	1.20 38 540

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = 69.00		LAT. = 68.00		LAT. = 67.00		LAT. = 66.00		LAT. = 65.00	
LONG. = 98.00		LONG. = 105.00		LONG. = 112.00		LONG. = 119.00		LONG. = 126.00	
RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC
(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG
10.00	15 131	13.00	12 147	16.00	9 162	19.00	6 176	22.00	3 189
9.00	13 132	12.00	10 148	15.00	7 163	18.00	5 177	21.00	3 190
8.00	11 133	11.00	8 149	14.00	5 164	17.00	3 178	20.00	1 191
7.00	9 134	10.00	6 150	13.00	3 165	16.00	1 179	19.00	-1 192
6.00	7 135	9.00	4 151	12.00	1 166	15.00	-1 180	18.00	-3 193
5.00	5 136	8.00	2 152	11.00	-1 167	14.00	-3 181	17.00	-5 194
4.00	3 137	7.00	0 153	10.00	-3 168	13.00	-5 182	16.00	-7 195
3.00	1 138	6.00	-2 154	9.00	-5 169	12.00	-7 183	15.00	-9 196
2.00	-1 139	5.00	-4 155	8.00	-7 170	11.00	-9 184	14.00	-11 197
1.00	-3 140	4.00	-6 156	7.00	-9 171	10.00	-11 185	13.00	-13 198
0.00	-5 141	3.00	-8 157	6.00	-11 172	9.00	-13 186	12.00	-15 199
-1.00	-7 142	2.00	-10 158	5.00	-13 173	8.00	-15 187	11.00	-17 200
-2.00	-9 143	1.00	-12 159	4.00	-15 174	7.00	-17 188	10.00	-19 201
-3.00	-11 144	0.00	-14 160	3.00	-17 175	6.00	-19 189	9.00	-21 202
-4.00	-13 145	-1.00	-16 161	2.00	-19 176	5.00	-21 190	8.00	-23 203
-5.00	-15 146	-2.00	-18 162	1.00	-21 177	4.00	-23 191	7.00	-25 204
-6.00	-17 147	-3.00	-20 163	0.00	-23 178	3.00	-25 192	6.00	-27 205
-7.00	-19 148	-4.00	-22 164	-1.00	-25 179	2.00	-27 193	5.00	-29 206
-8.00	-21 149	-5.00	-24 165	-2.00	-27 180	1.00	-29 194	4.00	-31 207
-9.00	-23 150	-6.00	-26 166	-3.00	-29 181	0.00	-31 195	3.00	-33 208
-10.00	-25 151	-7.00	-28 167	-4.00	-31 182	-1.00	-33 196	2.00	-35 209
-11.00	-27 152	-8.00	-30 168	-5.00	-33 183	-2.00	-35 197	1.00	-37 210
-12.00	-29 153	-9.00	-32 169	-6.00	-35 184	-3.00	-37 198	0.00	-39 211
-13.00	-31 154	-10.00	-34 170	-7.00	-37 185	-4.00	-39 199	-1.00	-41 212
-14.00	-33 155	-11.00	-36 171	-8.00	-39 186	-5.00	-41 200	-2.00	-43 213
-15.00	-35 156	-12.00	-38 172	-9.00	-41 187	-6.00	-43 201	-3.00	-45 214
-16.00	-37 157	-13.00	-40 173	-10.00	-43 188	-7.00	-45 202	-4.00	-47 215
-17.00	-39 158	-14.00	-42 174	-11.00	-45 189	-8.00	-47 203	-5.00	-49 216
-18.00	-41 159	-15.00	-44 175	-12.00	-47 190	-9.00	-49 204	-6.00	-51 217
-19.00	-43 160	-16.00	-46 176	-13.00	-49 191	-10.00	-51 205	-7.00	-53 218
-20.00	-45 161	-17.00	-48 177	-14.00	-51 192	-11.00	-53 206	-8.00	-55 219
-21.00	-47 162	-18.00	-50 178	-15.00	-53 193	-12.00	-55 207	-9.00	-57 220
-22.00	-49 163	-19.00	-52 179	-16.00	-55 194	-13.00	-57 208	-10.00	-59 221
-23.00	-51 164	-20.00	-54 180	-17.00	-57 195	-14.00	-59 209	-11.00	-61 222
-24.00	-53 165	-21.00	-56 181	-18.00	-59 196	-15.00	-61 210	-12.00	-63 223
-25.00	-55 166	-22.00	-58 182	-19.00	-61 197	-16.00	-63 211	-13.00	-65 224
-26.00	-57 167	-23.00	-60 183	-20.00	-63 198	-17.00	-65 212	-14.00	-67 225
-27.00	-59 168	-24.00	-62 184	-21.00	-65 199	-18.00	-67 213	-15.00	-69 226
-28.00	-61 169	-25.00	-64 185	-22.00	-67 200	-19.00	-69 214	-16.00	-71 227
-29.00	-63 170	-26.00	-66 186	-23.00	-69 201	-20.00	-71 215	-17.00	-73 228
-30.00	-65 171	-27.00	-68 187	-24.00	-71 202	-21.00	-73 216	-18.00	-75 229
-31.00	-67 172	-28.00	-70 188	-25.00	-73 203	-22.00	-75 217	-19.00	-77 230
-32.00	-69 173	-29.00	-72 189	-26.00	-75 204	-23.00	-77 218	-20.00	-79 231
-33.00	-71 174	-30.00	-74 190	-27.00	-77 205	-24.00	-79 219	-21.00	-81 232
-34.00	-73 175	-31.00	-76 191	-28.00	-79 206	-25.00	-81 220	-22.00	-83 233
-35.00	-75 176	-32.00	-78 192	-29.00	-81 207	-26.00	-83 221	-23.00	-85 234
-36.00	-77 177	-33.00	-80 193	-30.00	-83 208	-27.00	-85 222	-24.00	-87 235
-37.00	-79 178	-34.00	-82 194	-31.00	-85 209	-28.00	-87 223	-25.00	-89 236
-38.00	-81 179	-35.00	-84 195	-32.00	-87 210	-29.00	-89 224	-26.00	-91 237
-39.00	-83 180	-36.00	-86 196	-33.00	-89 211	-30.00	-91 225	-27.00	-93 238
-40.00	-85 181	-37.00	-88 197	-34.00	-91 212	-31.00	-93 226	-28.00	-95 239
-41.00	-87 182	-38.00	-90 198	-35.00	-93 213	-32.00	-95 227	-29.00	-97 240
-42.00	-89 183	-39.00	-92 199	-36.00	-95 214	-33.00	-97 228	-30.00	-99 241
-43.00	-91 184	-40.00	-94 200	-37.00	-97 215	-34.00	-99 229	-31.00	-101 242
-44.00	-93 185	-41.00	-96 201	-38.00	-99 216	-35.00	-101 230	-32.00	-103 243
-45.00	-95 186	-42.00	-98 202	-39.00	-101 217	-36.00	-103 231	-33.00	-105 244
-46.00	-97 187	-43.00	-100 203	-40.00	-103 218	-37.00	-105 232	-34.00	-107 245
-47.00	-99 188	-44.00	-102 204	-41.00	-105 219	-38.00	-107 233	-35.00	-109 246
-48.00	-101 189	-45.00	-104 205	-42.00	-107 220	-39.00	-109 234	-36.00	-111 247
-49.00	-103 190	-46.00	-106 206	-43.00	-109 221	-40.00	-111 235	-37.00	-113 248
-50.00	-105 191	-47.00	-108 207	-44.00	-111 222	-41.00	-113 236	-38.00	-115 249
-51.00	-107 192	-48.00	-110 208	-45.00	-113 223	-42.00	-115 237	-39.00	-117 250
-52.00	-109 193	-49.00	-112 209	-46.00	-115 224	-43.00	-117 238	-40.00	-119 251
-53.00	-111 194	-50.00	-114 210	-47.00	-117 225	-44.00	-119 239	-41.00	-121 252
-54.00	-113 195	-51.00	-116 211	-48.00	-119 226	-45.00	-121 240	-42.00	-123 253
-55.00	-115 196	-52.00	-118 212	-49.00	-121 227	-46.00	-123 241	-43.00	-125 254
-56.00	-117 197	-53.00	-120 213	-50.00	-123 228	-47.00	-125 242	-44.00	-127 255
-57.00	-119 198	-54.00	-122 214	-51.00	-125 229	-48.00	-127 243	-45.00	-129 256
-58.00	-121 199	-55.00	-124 215	-52.00	-127 230	-49.00	-129 244	-46.00	-131 257
-59.00	-123 200	-56.00	-126 216	-53.00	-129 231	-50.00	-131 245	-47.00	-133 258
-60.00	-125 201	-57.00	-128 217	-54.00	-131 232	-51.00	-133 246	-48.00	-135 259
-61.00	-127 202	-58.00	-130 218	-55.00	-133 233	-52.00	-135 247	-49.00	-137 260
-62.00	-129 203	-59.00	-132 219	-56.00	-135 234	-53.00	-137 248	-50.00	-139 261
-63.00	-131 204	-60.00	-134 220	-57.00	-137 235	-54.00	-139 249	-51.00	-141 262
-64.00	-133 205	-61.00	-136 221	-58.00	-139 236	-55.00	-141 250	-52.00	-143 263
-65.00	-135 206	-62.00	-138 222	-59.00	-141 237	-56.00	-143 251	-53.00	-145 264
-66.00	-137 207	-63.00	-140 223	-60.00	-143 238	-57.00	-145 252	-54.00	-147 265
-67.00	-139 208	-64.00	-142 224	-61.00	-145 239	-58.00	-147 253	-55.00	-149 266
-68.00	-141 209	-65.00	-144 225	-62.00	-147 240	-59.00	-149 254	-56.00	-151 267
-69.00	-143 210	-66.00	-146 226	-63.00	-149 241	-60.00	-151 255	-57.00	-153 268
-70.00	-145 211	-67.00	-148 227	-64.00	-151 242	-61.00	-153 256	-58.00	-155 269
-71.00	-147 212	-68.00	-150 228	-65.00	-153 243	-62.00	-155 257	-59.00	-157 270
-72.00	-149 213	-69.00	-152 229	-66.00	-155 244	-63.00	-157 258	-60.00	-159 271
-73.00	-151 214	-70.00	-154 230	-67.00	-157 245	-64.00	-159 259	-61.00	-161 272
-74.00	-153 215	-71.00	-156 231	-68.00	-159 246	-65.00	-161 260	-62.00	-163 273
-75.00	-155 216	-72.00	-158 232	-69.00	-161 247	-66.00	-163 261	-63.00	-165 274
-76.00	-157 217	-73.00	-160 233	-70.00	-163 248	-67.00	-165 262	-64.00	-167 275
-77.00	-159 218	-74.00	-162 234	-71.00	-165 249	-68.00	-167 263	-65.00	-169 276
-78.00	-161 219	-75.00	-164 235	-72.00	-167 250	-69.00	-169 264	-66.00	-171 277
-79.00	-163 220	-76.00	-166 236	-73.00	-169 251	-70.00	-171 265	-67.00	-173 278
-80.00	-165 221	-77.00	-168 237	-74.00	-171 252	-71.00	-173 266	-68.00	-175 279
-81.00	-167 222	-78.00	-170 238	-75.00	-173 253	-72.00	-175 267	-69.00	-177 280
-82.00	-169 223	-79.00	-172 239	-76.00	-175 254	-73.00	-177 268	-70.00	-179 281
-83.00	-171 224	-80.00	-174 240	-77.00	-177 255	-74.00	-179 269	-71.00	-181 282
-84.00	-173 225	-81.00	-176 241	-78.00	-179 256	-75.00	-181 270	-72.00	-183 283
-85.00	-175 226	-82.00	-178 242	-79.00	-181 257	-76.00	-183 271	-73.00	-185 284
-86.00	-177 227	-83.00	-180 243	-80.00	-183 258	-77.00	-185 272	-74.00	-187 285
-87.00	-179 228	-84.00	-182 244	-81.00	-185 259	-78.00	-187 273	-75.00	-189 286
-88.00	-181 229	-85.00	-184 245	-82.00	-187 260	-79.00	-189 274	-76.00	-191 287
-89.00	-183 230	-86.00	-186 246	-83.00	-189 261	-80.00	-191 275	-77.00	-193 288
-90.00	-185 231	-87.00	-188 247	-84.00	-191 262	-81.00	-193 276	-78.00	-195 289
-91.00	-187 232	-88.00	-190 248	-85.00	-193 263	-82.00	-195 277	-79.00	-197 290
-92.00	-189 233	-89.00	-192 249	-86.00	-195 264	-83.00	-197 278	-80.00	-199 291
-93.00	-191 234	-90.00	-194 250	-87.00	-197 265	-84.00	-19		

TABLE A. (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = 60.00			LAT. = 60.00			LAT. = 60.00			LAT. = 60.00			LAT. = 60.00		
LONG. = 190.00			LONG. = 210.00			LONG. = 230.00			LONG. = 250.00			LONG. = 270.00		
RIG ASYMPTOTIC	LAT LONG		RIG ASYMPTOTIC	LAT LONG		RIG ASYMPTOTIC	LAT LONG		RIG ASYMPTOTIC	LAT LONG		RIG ASYMPTOTIC	LAT LONG	
(Gd)			(Gd)			(Gd)			(Gd)			(Gd)		
10.00	3	287	10.00	14	-195	10.00	21	-123	10.00	28	-104	10.00	33	-90
9.00	3	288	9.00	14	-134	9.00	21	-122	9.00	27	-107	9.00	33	-90
8.00	3	289	8.00	12	-132	8.00	19	-120	8.00	26	-106	8.00	31	-89
7.00	3	290	7.00	9	-129	7.00	16	-118	7.00	22	-105	7.00	29	-88
6.00	3	291	6.00	5	-126	6.00	10	-117	6.00	18	-104	6.00	25	-86
5.00	3	292	5.00	14	-122	5.00	5	-115	5.00	14	-104	5.00	23	-85
4.00	3	293	4.00	14	-123	4.00	2	-114	4.00	11	-104	4.00	20	-83
3.00	3	294	3.00	10	-119	3.00	8	-113	3.00	4	-104	3.00	14	-83
2.00	3	295	2.00	21	-114	2.00	21	-102	2.00	7	-94	2.00	5	-85
1.00	3	296	1.00	21	-113	1.00	24	-100	1.00	9	-94	1.00	4	-85
0.00	3	297	0.00	22	-111	0.00	25	-98	0.00	10	-94	0.00	3	-85
-1.00	3	298	-1.00	22	-111	-1.00	25	-98	-1.00	10	-94	-1.00	2	-84
-2.00	3	299	-2.00	24	-109	-2.00	26	-95	-2.00	11	-94	-2.00	0	-84
-3.00	3	300	-3.00	24	-109	-3.00	26	-95	-3.00	11	-94	-3.00	0	-84
-4.00	3	301	-4.00	24	-109	-4.00	26	-95	-4.00	11	-94	-4.00	0	-84
-5.00	3	302	-5.00	24	-109	-5.00	26	-95	-5.00	11	-94	-5.00	0	-84
-6.00	3	303	-6.00	24	-109	-6.00	26	-95	-6.00	11	-94	-6.00	0	-84
-7.00	3	304	-7.00	24	-109	-7.00	26	-95	-7.00	11	-94	-7.00	0	-84
-8.00	3	305	-8.00	24	-109	-8.00	26	-95	-8.00	11	-94	-8.00	0	-84
-9.00	3	306	-9.00	24	-109	-9.00	26	-95	-9.00	11	-94	-9.00	0	-84
-10.00	3	307	-10.00	24	-109	-10.00	26	-95	-10.00	11	-94	-10.00	0	-84
-11.00	3	308	-11.00	24	-109	-11.00	26	-95	-11.00	11	-94	-11.00	0	-84
-12.00	3	309	-12.00	24	-109	-12.00	26	-95	-12.00	11	-94	-12.00	0	-84
-13.00	3	310	-13.00	24	-109	-13.00	26	-95	-13.00	11	-94	-13.00	0	-84
-14.00	3	311	-14.00	24	-109	-14.00	26	-95	-14.00	11	-94	-14.00	0	-84
-15.00	3	312	-15.00	24	-109	-15.00	26	-95	-15.00	11	-94	-15.00	0	-84
-16.00	3	313	-16.00	24	-109	-16.00	26	-95	-16.00	11	-94	-16.00	0	-84
-17.00	3	314	-17.00	24	-109	-17.00	26	-95	-17.00	11	-94	-17.00	0	-84
-18.00	3	315	-18.00	24	-109	-18.00	26	-95	-18.00	11	-94	-18.00	0	-84
-19.00	3	316	-19.00	24	-109	-19.00	26	-95	-19.00	11	-94	-19.00	0	-84
-20.00	3	317	-20.00	24	-109	-20.00	26	-95	-20.00	11	-94	-20.00	0	-84
-21.00	3	318	-21.00	24	-109	-21.00	26	-95	-21.00	11	-94	-21.00	0	-84
-22.00	3	319	-22.00	24	-109	-22.00	26	-95	-22.00	11	-94	-22.00	0	-84
-23.00	3	320	-23.00	24	-109	-23.00	26	-95	-23.00	11	-94	-23.00	0	-84
-24.00	3	321	-24.00	24	-109	-24.00	26	-95	-24.00	11	-94	-24.00	0	-84
-25.00	3	322	-25.00	24	-109	-25.00	26	-95	-25.00	11	-94	-25.00	0	-84
-26.00	3	323	-26.00	24	-109	-26.00	26	-95	-26.00	11	-94	-26.00	0	-84
-27.00	3	324	-27.00	24	-109	-27.00	26	-95	-27.00	11	-94	-27.00	0	-84
-28.00	3	325	-28.00	24	-109	-28.00	26	-95	-28.00	11	-94	-28.00	0	-84
-29.00	3	326	-29.00	24	-109	-29.00	26	-95	-29.00	11	-94	-29.00	0	-84
-30.00	3	327	-30.00	24	-109	-30.00	26	-95	-30.00	11	-94	-30.00	0	-84
-31.00	3	328	-31.00	24	-109	-31.00	26	-95	-31.00	11	-94	-31.00	0	-84
-32.00	3	329	-32.00	24	-109	-32.00	26	-95	-32.00	11	-94	-32.00	0	-84
-33.00	3	330	-33.00	24	-109	-33.00	26	-95	-33.00	11	-94	-33.00	0	-84
-34.00	3	331	-34.00	24	-109	-34.00	26	-95	-34.00	11	-94	-34.00	0	-84
-35.00	3	332	-35.00	24	-109	-35.00	26	-95	-35.00	11	-94	-35.00	0	-84
-36.00	3	333	-36.00	24	-109	-36.00	26	-95	-36.00	11	-94	-36.00	0	-84
-37.00	3	334	-37.00	24	-109	-37.00	26	-95	-37.00	11	-94	-37.00	0	-84
-38.00	3	335	-38.00	24	-109	-38.00	26	-95	-38.00	11	-94	-38.00	0	-84
-39.00	3	336	-39.00	24	-109	-39.00	26	-95	-39.00	11	-94	-39.00	0	-84
-40.00	3	337	-40.00	24	-109	-40.00	26	-95	-40.00	11	-94	-40.00	0	-84
-41.00	3	338	-41.00	24	-109	-41.00	26	-95	-41.00	11	-94	-41.00	0	-84
-42.00	3	339	-42.00	24	-109	-42.00	26	-95	-42.00	11	-94	-42.00	0	-84
-43.00	3	340	-43.00	24	-109	-43.00	26	-95	-43.00	11	-94	-43.00	0	-84
-44.00	3	341	-44.00	24	-109	-44.00	26	-95	-44.00	11	-94	-44.00	0	-84
-45.00	3	342	-45.00	24	-109	-45.00	26	-95	-45.00	11	-94	-45.00	0	-84
-46.00	3	343	-46.00	24	-109	-46.00	26	-95	-46.00	11	-94	-46.00	0	-84
-47.00	3	344	-47.00	24	-109	-47.00	26	-95	-47.00	11	-94	-47.00	0	-84
-48.00	3	345	-48.00	24	-109	-48.00	26	-95	-48.00	11	-94	-48.00	0	-84
-49.00	3	346	-49.00	24	-109	-49.00	26	-95	-49.00	11	-94	-49.00	0	-84
-50.00	3	347	-50.00	24	-109	-50.00	26	-95	-50.00	11	-94	-50.00	0	-84
-51.00	3	348	-51.00	24	-109	-51.00	26	-95	-51.00	11	-94	-51.00	0	-84
-52.00	3	349	-52.00	24	-109	-52.00	26	-95	-52.00	11	-94	-52.00	0	-84
-53.00	3	350	-53.00	24	-109	-53.00	26	-95	-53.00	11	-94	-53.00	0	-84
-54.00	3	351	-54.00	24	-109	-54.00	26	-95	-54.00	11	-94	-54.00	0	-84
-55.00	3	352	-55.00	24	-109	-55.00	26	-95	-55.00	11	-94	-55.00	0	-84
-56.00	3	353	-56.00	24	-109	-56.00	26	-95	-56.00	11	-94	-56.00	0	-84
-57.00	3	354	-57.00	24	-109	-57.00	26	-95	-57.00	11	-94	-57.00	0	-84
-58.00	3	355	-58.00	24	-109	-58.00	26	-95	-58.00	11	-94	-58.00	0	-84
-59.00	3	356	-59.00	24	-109	-59.00	26	-95	-59.00	11	-94	-59.00	0	-84
-60.00	3	357	-60.00	24	-109	-60.00	26	-95	-60.00	11	-94	-60.00	0	-84

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = 60.00 LONG. = 278.00			LAT. = 60.00 LONG. = 285.00			LAT. = 60.00 LONG. = 300.0			LAT. = 60.00 LONG. = 315.00			LAT. = 60.00 LONG. = 330.00		
RIG ASYMPTOTIC (GV) LAT LONG			RIG ASYMPTOTIC (GV) LAT LONG			RIG ASYMPTOTIC (GV) LAT LONG			RIG ASYMPTOTIC (GV) LAT LONG			RIG ASYMPTOTIC (GV) LAT LONG		
10.00	37	-70	10.00	37	-64	10.00	35	-27	10.00	31	-7	10.00	26	11
9.00	36	-70	9.00	37	-66	9.00	35	-27	9.00	31	-7	9.00	26	11
8.00	35	-69	8.00	36	-43	8.00	35	-26	8.00	31	-6	8.00	26	12
7.00	34	-68	7.00	35	-46	7.00	34	-23	7.00	30	-3	7.00	25	16
6.00	33	-67	6.00	34	-44	6.00	33	-21	6.00	29	1	6.00	24	20
5.00	32	-66	5.00	33	-45	5.00	32	-22	5.00	28	1	5.00	23	24
4.00	31	-65	4.00	32	-47	4.00	31	-21	4.00	27	1	4.00	22	28
3.00	30	-64	3.00	31	-46	3.00	30	-19	3.00	26	1	3.00	21	32
2.00	29	-63	2.00	30	-48	2.00	29	-18	2.00	25	1	2.00	20	36
1.00	28	-62	1.00	29	-50	1.00	28	-17	1.00	24	1	1.00	19	40
0.00	27	-61	0.00	28	-52	0.00	27	-16	0.00	23	1	0.00	18	44
-1.00	26	-60	-1.00	27	-54	-1.00	26	-15	-1.00	22	1	-1.00	17	48
-2.00	25	-59	-2.00	26	-56	-2.00	25	-14	-2.00	21	1	-2.00	16	52
-3.00	24	-58	-3.00	25	-58	-3.00	24	-13	-3.00	20	1	-3.00	15	56
-4.00	23	-57	-4.00	24	-60	-4.00	23	-12	-4.00	19	1	-4.00	14	60
-5.00	22	-56	-5.00	23	-62	-5.00	22	-11	-5.00	18	1	-5.00	13	64
-6.00	21	-55	-6.00	22	-64	-6.00	21	-10	-6.00	17	1	-6.00	12	68
-7.00	20	-54	-7.00	21	-66	-7.00	20	-9	-7.00	16	1	-7.00	11	72
-8.00	19	-53	-8.00	20	-68	-8.00	19	-8	-8.00	15	1	-8.00	10	76
-9.00	18	-52	-9.00	19	-70	-9.00	18	-7	-9.00	14	1	-9.00	9	80
-10.00	17	-51	-10.00	18	-72	-10.00	17	-6	-10.00	13	1	-10.00	8	84
-11.00	16	-50	-11.00	17	-74	-11.00	16	-5	-11.00	12	1	-11.00	7	88
-12.00	15	-49	-12.00	16	-76	-12.00	15	-4	-12.00	11	1	-12.00	6	92
-13.00	14	-48	-13.00	15	-78	-13.00	14	-3	-13.00	10	1	-13.00	5	96
-14.00	13	-47	-14.00	14	-80	-14.00	13	-2	-14.00	9	1	-14.00	4	100
-15.00	12	-46	-15.00	13	-82	-15.00	12	-1	-15.00	8	1	-15.00	3	104
-16.00	11	-45	-16.00	12	-84	-16.00	11	0	-16.00	7	1	-16.00	2	108
-17.00	10	-44	-17.00	11	-86	-17.00	10	0	-17.00	6	1	-17.00	1	112
-18.00	9	-43	-18.00	10	-88	-18.00	9	0	-18.00	5	1	-18.00	0	116
-19.00	8	-42	-19.00	9	-90	-19.00	8	0	-19.00	4	1	-19.00	-1	120
-20.00	7	-41	-20.00	8	-92	-20.00	7	0	-20.00	3	1	-20.00	-2	124
-21.00	6	-40	-21.00	7	-94	-21.00	6	0	-21.00	2	1	-21.00	-3	128
-22.00	5	-39	-22.00	6	-96	-22.00	5	0	-22.00	1	1	-22.00	-4	132
-23.00	4	-38	-23.00	5	-98	-23.00	4	0	-23.00	0	1	-23.00	-5	136
-24.00	3	-37	-24.00	4	-100	-24.00	3	0	-24.00	-1	1	-24.00	-6	140
-25.00	2	-36	-25.00	3	-102	-25.00	2	0	-25.00	-2	1	-25.00	-7	144
-26.00	1	-35	-26.00	2	-104	-26.00	1	0	-26.00	-3	1	-26.00	-8	148
-27.00	0	-34	-27.00	1	-106	-27.00	0	0	-27.00	-4	1	-27.00	-9	152
-28.00	-1	-33	-28.00	0	-108	-28.00	-1	0	-28.00	-5	1	-28.00	-10	156
-29.00	-2	-32	-29.00	-1	-110	-29.00	-2	0	-29.00	-6	1	-29.00	-11	160
-30.00	-3	-31	-30.00	-2	-112	-30.00	-3	0	-30.00	-7	1	-30.00	-12	164
-31.00	-4	-30	-31.00	-3	-114	-31.00	-4	0	-31.00	-8	1	-31.00	-13	168
-32.00	-5	-29	-32.00	-4	-116	-32.00	-5	0	-32.00	-9	1	-32.00	-14	172
-33.00	-6	-28	-33.00	-5	-118	-33.00	-6	0	-33.00	-10	1	-33.00	-15	176
-34.00	-7	-27	-34.00	-6	-120	-34.00	-7	0	-34.00	-11	1	-34.00	-16	180
-35.00	-8	-26	-35.00	-7	-122	-35.00	-8	0	-35.00	-12	1	-35.00	-17	184
-36.00	-9	-25	-36.00	-8	-124	-36.00	-9	0	-36.00	-13	1	-36.00	-18	188
-37.00	-10	-24	-37.00	-9	-126	-37.00	-10	0	-37.00	-14	1	-37.00	-19	192
-38.00	-11	-23	-38.00	-10	-128	-38.00	-11	0	-38.00	-15	1	-38.00	-20	196
-39.00	-12	-22	-39.00	-11	-130	-39.00	-12	0	-39.00	-16	1	-39.00	-21	200
-40.00	-13	-21	-40.00	-12	-132	-40.00	-13	0	-40.00	-17	1	-40.00	-22	204
-41.00	-14	-20	-41.00	-13	-134	-41.00	-14	0	-41.00	-18	1	-41.00	-23	208
-42.00	-15	-19	-42.00	-14	-136	-42.00	-15	0	-42.00	-19	1	-42.00	-24	212
-43.00	-16	-18	-43.00	-15	-138	-43.00	-16	0	-43.00	-20	1	-43.00	-25	216
-44.00	-17	-17	-44.00	-16	-140	-44.00	-17	0	-44.00	-21	1	-44.00	-26	220
-45.00	-18	-16	-45.00	-17	-142	-45.00	-18	0	-45.00	-22	1	-45.00	-27	224
-46.00	-19	-15	-46.00	-18	-144	-46.00	-19	0	-46.00	-23	1	-46.00	-28	228
-47.00	-20	-14	-47.00	-19	-146	-47.00	-20	0	-47.00	-24	1	-47.00	-29	232
-48.00	-21	-13	-48.00	-20	-148	-48.00	-21	0	-48.00	-25	1	-48.00	-30	236
-49.00	-22	-12	-49.00	-21	-150	-49.00	-22	0	-49.00	-26	1	-49.00	-31	240
-50.00	-23	-11	-50.00	-22	-152	-50.00	-23	0	-50.00	-27	1	-50.00	-32	244
-51.00	-24	-10	-51.00	-23	-154	-51.00	-24	0	-51.00	-28	1	-51.00	-33	248
-52.00	-25	-9	-52.00	-24	-156	-52.00	-25	0	-52.00	-29	1	-52.00	-34	252
-53.00	-26	-8	-53.00	-25	-158	-53.00	-26	0	-53.00	-30	1	-53.00	-35	256
-54.00	-27	-7	-54.00	-26	-160	-54.00	-27	0	-54.00	-31	1	-54.00	-36	260
-55.00	-28	-6	-55.00	-27	-162	-55.00	-28	0	-55.00	-32	1	-55.00	-37	264
-56.00	-29	-5	-56.00	-28	-164	-56.00	-29	0	-56.00	-33	1	-56.00	-38	268
-57.00	-30	-4	-57.00	-29	-166	-57.00	-30	0	-57.00	-34	1	-57.00	-39	272
-58.00	-31	-3	-58.00	-30	-168	-58.00	-31	0	-58.00	-35	1	-58.00	-40	276
-59.00	-32	-2	-59.00	-31	-170	-59.00	-32	0	-59.00	-36	1	-59.00	-41	280
-60.00	-33	-1	-60.00	-32	-172	-60.00	-33	0	-60.00	-37	1	-60.00	-42	284
-61.00	-34	0	-61.00	-33	-174	-61.00	-34	0	-61.00	-38	1	-61.00	-43	288
-62.00	-35	0	-62.00	-34	-176	-62.00	-35	0	-62.00	-39	1	-62.00	-44	292
-63.00	-36	0	-63.00	-35	-178	-63.00	-36	0	-63.00	-40	1	-63.00	-45	296
-64.00	-37	0	-64.00	-36	-180	-64.00	-37	0	-64.00	-41	1	-64.00	-46	300
-65.00	-38	0	-65.00	-37	-182	-65.00	-38	0	-65.00	-42	1	-65.00	-47	304
-66.00	-39	0	-66.00	-38	-184	-66.00	-39	0	-66.00	-43	1	-66.00	-48	308
-67.00	-40	0	-67.00	-39	-186	-67.00	-40	0	-67.00	-44	1	-67.00	-49	312
-68.00	-41	0	-68.00	-40	-188	-68.00	-41	0	-68.00	-45	1	-68.00	-50	316
-69.00	-42	0	-69.00	-41	-190	-69.00	-42	0	-69.00	-46	1	-69.00	-51	320
-70.00	-43	0	-70.00	-42	-192	-70.00	-43	0	-70.00	-47	1	-70.00	-52	324
-71.00	-44	0	-71.00	-43	-194	-71.00	-44	0	-71.00	-48	1	-71.00	-53	328
-72.00	-45	0	-72.00	-44	-196	-72.00	-45	0	-72.00	-49	1	-72.00	-54	332
-73.00	-46	0	-73.00	-45	-198	-73.00	-46	0	-73.00	-50	1	-73.00	-55	336
-74.00	-47	0	-74.00	-46	-200	-74.00	-47	0	-74.00	-51	1	-74.00	-56	340
-75.00	-48	0	-75.00	-47	-202	-75.00	-48	0	-75.00	-52	1	-75.00	-57	344
-76.00	-49	0	-76.00	-48	-204	-76.00	-49	0	-76.00	-53	1	-76.00	-58	348
-77.00	-50	0	-77.00	-49	-206	-77.00	-50	0	-77.00	-54	1	-77.00	-59	352
-78.00	-51	0	-78.00	-50	-208	-78.00	-51	0	-78.00	-55	1	-78.00	-60	356
-79.00	-52	0	-79.00	-51	-210	-79.00	-52	0	-79.00	-56	1	-79.00	-61	360
-80.00	-53	0	-80.00	-52	-212	-80.00	-53	0	-80.00	-57	1	-80.00	-62	364
-81.00	-54	0	-81.00	-53	-214	-81.00	-54	0	-81.00	-58	1	-81.00	-63	368
-82.00	-55	0	-82.00	-54	-216	-82.00	-55	0	-82.00	-59	1	-82.00	-64	372
-83.00	-56	0	-83.00	-55	-218	-83.00	-56	0	-83.00	-60	1	-83.00	-65	376
-84.00														

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 95.00 LONG. = 0.00		GEOGRAPHIC LAT. = 95.00 LONG. = 15.00		GEOGRAPHIC LAT. = 95.00 LONG. = 30.00		GEOGRAPHIC LAT. = 95.00 LONG. = 45.00		GEOGRAPHIC LAT. = 55.00 LONG. = 60.00		GEOGRAPHIC LAT. = 55.00 LONG. = 75.00	
RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC
(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG
10.00	6 49	10.00	5 64	10.00	4 76	10.00	4 93	10.00	3 106	10.00	2 124
9.00	6 50	9.00	4 65	9.00	3 80	9.00	3 95	9.00	2 116	9.00	1 126
8.00	6 52	8.00	4 68	8.00	3 83	8.00	3 98	8.00	1 114	8.00	0 136
7.00	6 57	7.00	2 73	7.00	1 89	7.00	-1 105	7.00	-2 121	7.00	-4 137
6.00	-1 65	6.00	-3 82	6.00	-5 99	6.00	-7 115	6.00	-9 131	6.00	-11 148
5.00	-9 78	5.00	-11 98	5.00	-12 113	5.00	-13 130	5.00	-14 147	5.00	-15 165
4.00	-18 86	4.00	-19 109	4.00	-19 129	4.00	-19 148	4.00	-19 167	4.00	-18 187
3.00	-18 87	3.00	4 158	3.00	-9 131	3.00	-8 151	3.00	-9 171	3.00	-10 192
2.00	-9 89	2.00	3 157	2.00	-8 134	2.00	-8 154	2.00	-9 175	2.00	-10 197
1.00	-9 91	1.00	13 177	1.00	-8 138	1.00	-7 159	1.00	-7 180	1.00	-7 203
0.00	-9 94	0.00	16 180	0.00	-7 142	0.00	-6 164	0.00	-6 186	0.00	-5 218
3.50	-10 97	3.50	16 286	3.50	-6 147	3.50	-5 170	3.50	-6 186	3.50	-5 218
3.40	-10 101	3.40	16 287	3.40	-5 134	3.40	-4 178	3.40	-5 203	3.40	-4 231
3.30	-10 106	3.30	3 282	3.30	-2 161	3.30	-2 187	3.30	-3 215	3.30	-4 247
3.20	-9 111	3.20	1 248	3.20	2 170	3.20	7 199	3.20	9 231	3.20	7 271
3.10	-8 116	3.10	-1 255	3.10	7 181	3.10	12 213	3.10	18 264	3.10	-12 315
3.00	-6 122	3.00	-11 264	3.00	12 195	3.00	12 236	3.00	-8 292	3.00	-17 323
2.90	-3 127	2.90	-13 277	2.90	15 212	2.90	-1 268	2.90	2 377	2.90	-21 334
2.80	0 132	2.80	-25 299	2.80	11 236	2.80	-4 273	2.80	9 513	2.80	-24 358
2.70	3 137	2.70	-13 351	2.70	-13 276	2.80	-8 278	2.80	-2 340	2.80	-19 374
2.60	6 143	2.60	1 479	2.60	-18 292	2.60	-12 294	2.60	-14 346	2.60	15 416
2.50	8 151	2.50	15 462	2.50	21 307	2.50	-16 291	2.50	-16 599	2.50	15 498
2.40	17 155	2.40	3 357	2.40	-26 331	2.40	-25 312	2.40	3 351	2.40	15 498
2.30	17 153	2.30	3 358	2.30	-26 331	2.30	-25 312	2.30	3 351	2.30	15 498
2.20	-27 241	2.20	-3 607	2.20	0 373	2.20	-18 358	2.20	5 410	2.20	15 498
2.10	-13 580	2.10	13 924	2.10	2.63	2.10	2.63	2.10	2.63	2.10	2.63
2.00	-5 493	2.00	-15 559	2.00	2.63	2.00	2.63	2.00	2.63	2.00	2.63
1.90	-8 526	1.90	2.35	1.90	2.35	1.90	2.35	1.90	2.35	1.90	2.35
1.80	18 365	1.80	18 365	1.80	18 365	1.80	18 365	1.80	18 365	1.80	18 365
1.70	20 461	1.70	20 461	1.70	20 461	1.70	20 461	1.70	20 461	1.70	20 461
1.60	-4 369	1.60	-4 369	1.60	-4 369	1.60	-4 369	1.60	-4 369	1.60	-4 369
1.50	19 403	1.50	19 403	1.50	19 403	1.50	19 403	1.50	19 403	1.50	19 403
1.40	-5 758	1.40	-5 758	1.40	-5 758	1.40	-5 758	1.40	-5 758	1.40	-5 758
1.30	4 681	1.30	4 681	1.30	4 681	1.30	4 681	1.30	4 681	1.30	4 681
1.20	R	1.20	R	1.20	R	1.20	R	1.20	R	1.20	R

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = 55.00 LONG. = 98.00		LAT. = 55.00 LONG. = 105.00		LAT. = 55.00 LONG. = 120.00		LAT. = 55.00 LONG. = 135.00		LAT. = 55.00 LONG. = 150.00		LAT. = 55.00 LONG. = 165.00	
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
18.00	8 180	11.00	-3 157	18.00	-8 174	10.00	-12 149	10.00	-16 282	10.00	-18 211
9.00	-3 183	2.00	-4 159	9.00	-9 176	9.00	-13 192	9.00	-16 286	9.00	-17 213
0.00	-7 154	3.00	-6 153	0.00	-10 188	0.00	-14 196	0.00	-17 208	0.00	-17 217
7.00	-17 186	7.00	-10 171	7.00	-13 180	7.00	-17 204	7.00	-19 236	7.00	-19 224
6.00	-14 165	5.00	-17 183	6.00	-20 202	6.00	-23 219	6.00	-25 232	6.00	-26 239
5.00	-17 164	3.00	-20 204	5.00	-22 227	5.00	-22 250	5.00	-24 266	5.00	-28 271
4.00	-17 186	4.00	-11 234	4.00	-21 238	4.00	-21 254	4.00	-22 271	4.00	-25 309
4.00	-17 188	3.00	-3 239	4.00	-20 233	4.00	-19 258	4.00	-19 275	4.00	-25 319
4.00	-16 198	1.00	-7 246	4.00	-18 237	4.00	-17 261	4.00	-17 279	3.00	-2 323
4.00	-15 192	1.00	-4 255	4.00	-17 239	4.00	-15 265	4.00	-14 283	3.00	1 324
4.00	-15 194	1.00	0 266	4.00	-16 243	4.00	-13 269	4.00	-11 287	3.00	9 333
4.00	-14 196	1.00	4 263	4.00	-14 246	4.00	-10 273	4.00	-8 291	3.00	9 338
4.00	-13 199	1.00	4 312	4.00	-13 249	4.00	-8 277	4.00	-3 296	3.00	3 408
4.00	-13 202	1.00	3 316	4.00	-11 253	4.00	-6 282	4.00	-3 301	3.00	1 419
4.00	-12 205	1.00	2 321	4.00	-9 257	4.00	-4 287	4.00	2 307	3.00	-2 436
4.00	-11 208	1.00	0 326	4.00	-8 262	4.00	-1 293	4.00	2 315	3.00	8 465
3.00	-18 214	1.00	-2 332	3.00	-5 269	3.00	-1 303	3.00	5 324	3.00	3 1062
3.00	-9 228	1.00	-3 338	3.00	-3 277	3.00	4 315	3.00	7 339	3.00	3.44 R
2.00	-6 227	1.00	-1 346	3.00	1 289	3.00	5 319	3.00	5 366		
3.00	-3 236	1.00	-11 356	3.00	4 300	3.00	-3 304	3.00	5 371		
3.00	1 248	1.00	-15 370	3.00	1 345	3.00	-5 395	3.00	4 375		
3.00	5 264	1.00	-15 390	3.00	-1 351	3.00	-7 410	3.00	3 381		
3.00	6 289	1.00	-1 423	3.00	-4 359	3.00	-4 434	3.00	1 387		
3.00	5 293	1.00	14 779	3.00	-6 368	3.00	19 493	3.00	0 394		
3.00	4 296	1.00	1.29 R	3.00	-9 380	3.00	3.56 R	3.00	-2 403		
3.00	3 280	1.00	1.28 R	3.00	-11 397	3.00	3.55 R	3.00	-3 414		
3.00	1 304	1.00	3.44 R	3.00	-5 425	3.00	3.54 R	3.00	-4 431		
3.00	-3 314	1.00	3.43 R	3.00	-17 578	3.00	3.62 R	3.00	-4 431		
3.00	-6 320	1.00	3.42 R	3.00	3.43 R	3.00	3.61 R	3.00	1 457		
3.00	-9 327	1.00	3.42 R	3.00	3.42 R	3.00	3.59 R	3.00	15 759		
3.00	-13 335	1.00	3.42 R	3.00	3.42 R	3.00	3.58 R	3.00	15 759		
3.00	-17 346	1.00	3.42 R	3.00	3.42 R	3.00	3.58 R	3.00	15 759		
3.00	-20 361	1.00	3.42 R	3.00	3.42 R	3.00	3.58 R	3.00	15 759		
3.00	-26 383	1.00	3.42 R	3.00	3.42 R	3.00	3.58 R	3.00	15 759		
3.00	7 428	1.00	3.42 R	3.00	3.42 R	3.00	3.58 R	3.00	15 759		
3.00	19 441	1.00	3.42 R	3.00	3.42 R	3.00	3.58 R	3.00	15 759		
3.00	19 441	1.00	3.42 R	3.00	3.42 R	3.00	3.58 R	3.00	15 759		

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = 50.00 LONG. = 0.00		LAT. = 50.00 LONG. = 15.00		LAT. = 50.00 LONG. = 30.00		LAT. = 50.00 LONG. = 45.00		LAT. = 50.00 LONG. = 60.00		LAT. = 50.00 LONG. = 75.00	
RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG	
10.00 -6 61		13.00 -3 78		10.00 -6 93		10.00 -9 108		10.00 -9 124		10.00 -11 141	
9.00 -7 84		3.00 -1 00		3.00 -9 96		9.00 -9 112		9.00 -9 128		9.00 -11 145	
8.00 -6 67		3.00 -1 00		8.00 -6 101		8.00 -9 118		8.00 -9 135		8.00 -11 152	
7.00 -6 67		7.00 -4 91		7.00 -8 110		7.00 -9 127		7.00 -10 146		7.00 -12 165	
6.00 -8 87		3.00 -10 100		6.00 -10 128		6.00 -11 147		6.00 -11 168		6.00 -12 189	
5.00 -10 113		3.00 -12 140		5.00 -11 165		5.00 -10 150		5.00 -11 171		5.00 -11 193	
4.00 -9 117		3.00 -13 145		4.00 -12 171		5.00 -10 153		5.00 -10 174		5.00 -10 197	
4.00 -7 120		3.00 -14 149		4.00 -13 177		5.00 -10 157		5.00 -9 178		5.00 -9 201	
4.00 -6 124		3.00 -15 155		4.00 -14 184		5.00 -9 160		5.00 -8 182		5.00 -7 206	
4.00 -5 128		3.00 -16 160		4.00 -15 192		5.00 -8 164		5.00 -7 187		5.00 -6 211	
4.00 -4 131		3.00 -17 166		4.00 -16 202		5.00 -7 168		5.00 -6 192		5.00 -5 217	
4.00 -3 135		3.00 -18 173		4.00 -17 214		5.00 -6 173		5.00 -5 197		5.00 -4 223	
4.00 -2 139		3.00 -19 181		4.00 -18 229		5.00 -5 178		5.00 -4 203		5.00 -3 228	
4.00 -1 143		3.00 -20 191		4.00 -19 249		5.00 -4 183		5.00 -3 209		5.00 -2 234	
4.00 0 146		3.00 -21 203		4.00 -20 265		5.00 -3 189		5.00 -2 217		5.00 -1 239	
3.00 14 159		3.00 -22 217		4.00 -21 283		4.00 -2 196		4.00 -1 226		4.00 0 244	
3.00 15 166		3.00 -23 237		4.00 -22 303		4.00 -1 204		4.00 0 237		4.00 0 248	
3.00 16 174		3.00 -24 278		4.00 -23 317		4.00 0 214		4.00 0 237		4.00 0 252	
3.00 17 185		3.00 -25 308		4.00 -24 336		4.00 0 226		4.00 0 251		4.00 0 256	
3.00 18 196		3.00 -26 324		4.00 -25 353		4.00 0 241		4.00 0 261		4.00 0 261	
3.00 19 207		3.00 -27 358		4.00 -26 369		4.00 0 250		4.00 0 269		4.00 0 269	
3.00 20 218		3.00 -28 368		4.00 -27 374		4.00 0 259		4.00 0 278		4.00 0 278	
3.00 21 229		3.00 -29 368		4.00 -28 374		4.00 0 268		4.00 0 287		4.00 0 287	
3.00 22 240		3.00 -30 368		4.00 -29 374		4.00 0 277		4.00 0 296		4.00 0 296	
3.00 23 251		3.00 -31 368		4.00 -30 374		4.00 0 286		4.00 0 305		4.00 0 305	
3.00 24 262		3.00 -32 368		4.00 -31 374		4.00 0 295		4.00 0 314		4.00 0 314	
3.00 25 273		3.00 -33 368		4.00 -32 374		4.00 0 304		4.00 0 323		4.00 0 323	
3.00 26 284		3.00 -34 368		4.00 -33 374		4.00 0 313		4.00 0 332		4.00 0 332	
3.00 27 295		3.00 -35 368		4.00 -34 374		4.00 0 322		4.00 0 341		4.00 0 341	
3.00 28 306		3.00 -36 368		4.00 -35 374		4.00 0 331		4.00 0 350		4.00 0 350	
3.00 29 317		3.00 -37 368		4.00 -36 374		4.00 0 340		4.00 0 359		4.00 0 359	
3.00 30 328		3.00 -38 368		4.00 -37 374		4.00 0 349		4.00 0 368		4.00 0 368	
3.00 31 339		3.00 -39 368		4.00 -38 374		4.00 0 358		4.00 0 377		4.00 0 377	
3.00 32 350		3.00 -40 368		4.00 -39 374		4.00 0 367		4.00 0 386		4.00 0 386	
3.00 33 361		3.00 -41 368		4.00 -40 374		4.00 0 376		4.00 0 395		4.00 0 395	
3.00 34 372		3.00 -42 368		4.00 -41 374		4.00 0 385		4.00 0 404		4.00 0 404	
3.00 35 383		3.00 -43 368		4.00 -42 374		4.00 0 394		4.00 0 413		4.00 0 413	
3.00 36 394		3.00 -44 368		4.00 -43 374		4.00 0 403		4.00 0 422		4.00 0 422	
3.00 37 405		3.00 -45 368		4.00 -44 374		4.00 0 412		4.00 0 431		4.00 0 431	
3.00 38 416		3.00 -46 368		4.00 -45 374		4.00 0 421		4.00 0 440		4.00 0 440	
3.00 39 427		3.00 -47 368		4.00 -46 374		4.00 0 430		4.00 0 449		4.00 0 449	
3.00 40 438		3.00 -48 368		4.00 -47 374		4.00 0 439		4.00 0 458		4.00 0 458	
3.00 41 449		3.00 -49 368		4.00 -48 374		4.00 0 448		4.00 0 467		4.00 0 467	
3.00 42 460		3.00 -50 368		4.00 -49 374		4.00 0 457		4.00 0 476		4.00 0 476	
3.00 43 471		3.00 -51 368		4.00 -50 374		4.00 0 466		4.00 0 485		4.00 0 485	
3.00 44 482		3.00 -52 368		4.00 -51 374		4.00 0 475		4.00 0 494		4.00 0 494	
3.00 45 493		3.00 -53 368		4.00 -52 374		4.00 0 484		4.00 0 503		4.00 0 503	
3.00 46 504		3.00 -54 368		4.00 -53 374		4.00 0 493		4.00 0 512		4.00 0 512	
3.00 47 515		3.00 -55 368		4.00 -54 374		4.00 0 502		4.00 0 521		4.00 0 521	
3.00 48 526		3.00 -56 368		4.00 -55 374		4.00 0 511		4.00 0 530		4.00 0 530	
3.00 49 537		3.00 -57 368		4.00 -56 374		4.00 0 520		4.00 0 539		4.00 0 539	
3.00 50 548		3.00 -58 368		4.00 -57 374		4.00 0 529		4.00 0 548		4.00 0 548	
3.00 51 559		3.00 -59 368		4.00 -58 374		4.00 0 538		4.00 0 557		4.00 0 557	
3.00 52 570		3.00 -60 368		4.00 -59 374		4.00 0 547		4.00 0 566		4.00 0 566	
3.00 53 581		3.00 -61 368		4.00 -60 374		4.00 0 556		4.00 0 575		4.00 0 575	
3.00 54 592		3.00 -62 368		4.00 -61 374		4.00 0 565		4.00 0 584		4.00 0 584	
3.00 55 603		3.00 -63 368		4.00 -62 374		4.00 0 574		4.00 0 593		4.00 0 593	
3.00 56 614		3.00 -64 368		4.00 -63 374		4.00 0 583		4.00 0 602		4.00 0 602	
3.00 57 625		3.00 -65 368		4.00 -64 374		4.00 0 592		4.00 0 611		4.00 0 611	
3.00 58 636		3.00 -66 368		4.00 -65 374		4.00 0 601		4.00 0 620		4.00 0 620	
3.00 59 647		3.00 -67 368		4.00 -66 374		4.00 0 610		4.00 0 629		4.00 0 629	
3.00 60 658		3.00 -68 368		4.00 -67 374		4.00 0 619		4.00 0 638		4.00 0 638	
3.00 61 669		3.00 -69 368		4.00 -68 374		4.00 0 628		4.00 0 647		4.00 0 647	
3.00 62 680		3.00 -70 368		4.00 -69 374		4.00 0 637		4.00 0 656		4.00 0 656	
3.00 63 691		3.00 -71 368		4.00 -70 374		4.00 0 646		4.00 0 665		4.00 0 665	
3.00 64 702		3.00 -72 368		4.00 -71 374		4.00 0 655		4.00 0 674		4.00 0 674	
3.00 65 713		3.00 -73 368		4.00 -72 374		4.00 0 664		4.00 0 683		4.00 0 683	
3.00 66 724		3.00 -74 368		4.00 -73 374		4.00 0 673		4.00 0 692		4.00 0 692	
3.00 67 735		3.00 -75 368		4.00 -74 374		4.00 0 682		4.00 0 701		4.00 0 701	
3.00 68 746		3.00 -76 368		4.00 -75 374		4.00 0 691		4.00 0 710		4.00 0 710	
3.00 69 757		3.00 -77 368		4.00 -76 374		4.00 0 700		4.00 0 719		4.00 0 719	
3.00 70 768		3.00 -78 368		4.00 -77 374		4.00 0 709		4.00 0 728		4.00 0 728	
3.00 71 779		3.00 -79 368		4.00 -78 374		4.00 0 718		4.00 0 737		4.00 0 737	
3.00 72 790		3.00 -80 368		4.00 -79 374		4.00 0 727		4.00 0 746		4.00 0 746	
3.00 73 801		3.00 -81 368		4.00 -80 374		4.00 0 736		4.00 0 755		4.00 0 755	
3.00 74 812		3.00 -82 368		4.00 -81 374		4.00 0 745		4.00 0 764		4.00 0 764	
3.00 75 823		3.00 -83 368		4.00 -82 374		4.00 0 754		4.00 0 773		4.00 0 773	
3.00 76 834		3.00 -84 368		4.00 -83 374		4.00 0 763		4.00 0 782		4.00 0 782	
3.00 77 845		3.00 -85 368		4.00 -84 374		4.00 0 772		4.00 0 791		4.00 0 791	
3.00 78 856		3.00 -86 368		4.00 -85 374		4.00 0 781		4.00 0 800		4.00 0 800	
3.00 79 867		3.00 -87 368		4.00 -86 374		4.00 0 790		4.00 0 809		4.00 0 809	
3.00 80 878		3.00 -88 368		4.00 -87 374		4.00 0 799		4.00 0 818		4.00 0 818	
3.00 81 889		3.00 -89 368		4.00 -88 374		4.00 0 808		4.00 0 827		4.00 0 827	
3.00 82 900		3.00 -90 368		4.00 -89 374		4.00 0 817		4.00 0 836		4.00 0 836	
3.00 83 911		3.00 -91 368		4.00 -90 374		4.00 0 826		4.00 0 845		4.00 0 845	
3.00 84 922		3.00 -92 368		4.00 -91 374		4.00 0 835		4.00 0 854		4.00 0 854	
3.00 85 933		3.00 -93 368		4.00 -92 374		4.00 0 844		4.00 0 863		4.00 0 863	
3.00 86 944		3.00 -94 368		4.00 -93 374		4.00 0 853		4.00 0 872		4.00 0 872	
3.00 87 955		3.00 -95 368		4.00 -94 374		4.00 0 862		4.00 0 881		4.00 0 881	
3.00 88 966		3.00 -96 368		4.00 -95 374		4.00 0 871		4.00 0 890		4.00 0 890	
3.00 89 977		3.00 -97 368		4.00 -96 374		4.00 0 880		4.00 0 899		4.00 0 899	
3.00 90 988		3.00 -98 368		4.00 -97 374		4.00 0 889		4.00 0 908		4.00 0 908	
3.00 91 999		3.00 -99 368		4.00 -98 374		4.00 0 898		4.00 0 917		4.00 0 917	
3.00 92 1010		3.00 -100 368		4.00 -99 374		4.00 0 907		4.00 0 926		4.00 0 926	
3.00 93 1021		3.00 -101 368		4.00 -100 374		4.00 0 916		4.00 0 935		4.00 0 935	
3.00 94 1032		3.00 -102 368		4.00 -101 374		4.00 0 925		4.00 0 944		4.00 0 944</	

TABLE 41 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 50.00 LONG. = 90.00	GEOGRAPHIC LAT. = 50.00 LONG. = 105.00	GEOGRAPHIC LAT. = 50.00 LONG. = 120.00	GEOGRAPHIC LAT. = 50.00 LONG. = 135.00	GEOGRAPHIC LAT. = 50.00 LONG. = 150.00	GEOGRAPHIC LAT. = 50.00 LONG. = 165.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
10.00 -13 180	11.00 -16 177	10.00 -20 196	10.00 -25 215	10.00 -28 229	10.00 -30 235
9.00 -13 183	9.00 -16 182	9.00 -20 202	9.00 -24 222	9.00 -27 235	9.00 -29 242
8.00 -13 184	8.00 -16 190	8.00 -19 210	8.00 -22 230	8.00 -24 245	8.00 -27 250
7.00 -13 184	7.00 -17 204	7.00 -19 225	7.00 -20 242	7.00 -21 253	7.00 -24 263
6.00 -13 212	6.00 -13 236	6.00 -16 227	6.00 -18 262	6.00 -19 275	6.00 -24 265
5.00 -12 216	5.00 -12 239	5.00 -16 230	5.00 -18 286	5.00 -18 301	5.00 -24 267
5.00 -10 228	5.00 -10 244	5.00 -18 232	5.00 -18 296	5.00 -18 309	5.00 -24 272
5.00 -8 225	5.00 -7 250	5.00 -18 235	5.00 -18 306	5.00 -18 319	5.00 -23 272
5.00 -6 231	5.00 -4 257	5.00 -17 238	5.00 -17 319	5.00 -17 332	5.00 -23 274
5.00 -3 237	5.00 -1 265	5.00 -17 241	5.00 -17 339	5.00 -17 353	5.00 -22 277
5.00 0 244	5.00 2 275	5.00 -16 245	5.00 -16 340	5.00 -16 356	5.00 -22 281
5.00 3 252	5.00 5 287	5.00 -15 249	5.00 -15 353	5.00 -15 368	5.00 -21 285
5.00 6 263	5.00 8 305	5.00 -14 254	5.00 -14 354	5.00 -14 368	5.00 -21 289
5.00 7 276	5.00 -2 332	5.00 -12 253	5.00 -12 357	5.00 -12 371	5.00 -20 293
5.00 5 294	5.00 -4 336	5.00 -10 264	5.00 -10 361	5.00 -10 375	5.00 -19 298
5.00 -3 323	5.00 -6 340	5.00 -8 271	5.00 -8 364	5.00 -8 378	5.00 -18 304
5.00 -10 327	5.00 -8 345	5.00 -4 276	5.00 -4 367	5.00 -4 381	5.00 -17 310
5.00 -12 332	5.00 -10 351	5.00 -1 287	5.00 -1 372	5.00 -1 386	5.00 -16 318
5.00 -15 337	5.00 -13 357	5.00 0 299	5.00 0 377	5.00 0 391	5.00 -15 327
5.00 -17 344	5.00 -15 365	5.00 3 316	5.00 3 384	5.00 3 398	5.00 -14 330
5.00 -20 351	5.00 -18 375	5.00 6 343	5.00 6 391	5.00 6 405	5.00 -13 336
5.00 -21 361	5.00 -19 387	5.00 9 371	5.00 9 398	5.00 9 412	5.00 -12 342
5.00 -21 374	5.00 -20 404	5.00 12 398	5.00 12 405	5.00 12 419	5.00 -11 348
5.00 -21 390	5.00 -21 427	5.00 15 427	5.00 15 434	5.00 15 448	5.00 -10 354
5.00 -21 411	5.00 -21 454	5.00 18 465	5.00 18 472	5.00 18 486	5.00 -9 360
5.00 -21 432	5.00 -21 481	5.00 21 492	5.00 21 499	5.00 21 513	5.00 -8 366
5.00 -21 453	5.00 -21 508	5.00 24 519	5.00 24 526	5.00 24 540	5.00 -7 372
5.00 -21 474	5.00 -21 535	5.00 27 546	5.00 27 553	5.00 27 567	5.00 -6 378
5.00 -21 495	5.00 -21 562	5.00 30 573	5.00 30 580	5.00 30 594	5.00 -5 384
5.00 -21 516	5.00 -21 589	5.00 33 600	5.00 33 607	5.00 33 621	5.00 -4 390
5.00 -21 537	5.00 -21 616	5.00 36 627	5.00 36 634	5.00 36 648	5.00 -3 396
5.00 -21 558	5.00 -21 643	5.00 39 654	5.00 39 661	5.00 39 675	5.00 -2 402
5.00 -21 579	5.00 -21 670	5.00 42 681	5.00 42 688	5.00 42 702	5.00 -1 408
5.00 -21 600	5.00 -21 697	5.00 45 708	5.00 45 715	5.00 45 729	5.00 0 414
5.00 -21 621	5.00 -21 724	5.00 48 735	5.00 48 742	5.00 48 756	5.00 3 420
5.00 -21 642	5.00 -21 751	5.00 51 762	5.00 51 769	5.00 51 783	5.00 6 426
5.00 -21 663	5.00 -21 778	5.00 54 789	5.00 54 796	5.00 54 810	5.00 9 432
5.00 -21 684	5.00 -21 805	5.00 57 816	5.00 57 823	5.00 57 837	5.00 12 438
5.00 -21 705	5.00 -21 832	5.00 60 843	5.00 60 850	5.00 60 864	5.00 15 444
5.00 -21 726	5.00 -21 859	5.00 63 870	5.00 63 877	5.00 63 891	5.00 18 450
5.00 -21 747	5.00 -21 886	5.00 66 897	5.00 66 904	5.00 66 918	5.00 21 456
5.00 -21 768	5.00 -21 913	5.00 69 924	5.00 69 931	5.00 69 945	5.00 24 462
5.00 -21 789	5.00 -21 940	5.00 72 951	5.00 72 958	5.00 72 972	5.00 27 468
5.00 -21 810	5.00 -21 967	5.00 75 978	5.00 75 985	5.00 75 999	5.00 30 474
5.00 -21 831	5.00 -21 994	5.00 78 1005	5.00 78 1012	5.00 78 1026	5.00 33 480
5.00 -21 852	5.00 -22 021	5.00 81 1032	5.00 81 1039	5.00 81 1053	5.00 36 486
5.00 -21 873	5.00 -22 048	5.00 84 1059	5.00 84 1066	5.00 84 1080	5.00 39 492
5.00 -21 894	5.00 -22 075	5.00 87 1086	5.00 87 1093	5.00 87 1107	5.00 42 498
5.00 -21 915	5.00 -22 102	5.00 90 1113	5.00 90 1120	5.00 90 1134	5.00 45 504
5.00 -21 936	5.00 -22 129	5.00 93 1140	5.00 93 1147	5.00 93 1161	5.00 48 510
5.00 -21 957	5.00 -22 156	5.00 96 1167	5.00 96 1174	5.00 96 1188	5.00 51 516
5.00 -21 978	5.00 -22 183	5.00 99 1194	5.00 99 1201	5.00 99 1215	5.00 54 522
5.00 -21 999	5.00 -22 210	5.00 102 1221	5.00 102 1228	5.00 102 1242	5.00 57 528
5.00 -22 020	5.00 -22 237	5.00 105 1248	5.00 105 1255	5.00 105 1269	5.00 60 534
5.00 -22 041	5.00 -22 264	5.00 108 1275	5.00 108 1282	5.00 108 1296	5.00 63 540
5.00 -22 062	5.00 -22 291	5.00 111 1302	5.00 111 1309	5.00 111 1323	5.00 66 546
5.00 -22 083	5.00 -22 318	5.00 114 1329	5.00 114 1336	5.00 114 1350	5.00 69 552
5.00 -22 104	5.00 -22 345	5.00 117 1356	5.00 117 1363	5.00 117 1377	5.00 72 558
5.00 -22 125	5.00 -22 372	5.00 120 1383	5.00 120 1390	5.00 120 1404	5.00 75 564
5.00 -22 146	5.00 -22 399	5.00 123 1410	5.00 123 1417	5.00 123 1431	5.00 78 570
5.00 -22 167	5.00 -22 426	5.00 126 1437	5.00 126 1444	5.00 126 1458	5.00 81 576
5.00 -22 188	5.00 -22 453	5.00 129 1464	5.00 129 1471	5.00 129 1485	5.00 84 582
5.00 -22 209	5.00 -22 480	5.00 132 1491	5.00 132 1498	5.00 132 1512	5.00 87 588
5.00 -22 230	5.00 -22 507	5.00 135 1518	5.00 135 1525	5.00 135 1539	5.00 90 594
5.00 -22 251	5.00 -22 534	5.00 138 1545	5.00 138 1552	5.00 138 1566	5.00 93 600
5.00 -22 272	5.00 -22 561	5.00 141 1572	5.00 141 1579	5.00 141 1593	5.00 96 606
5.00 -22 293	5.00 -22 588	5.00 144 1599	5.00 144 1606	5.00 144 1620	5.00 99 612
5.00 -22 314	5.00 -22 615	5.00 147 1626	5.00 147 1633	5.00 147 1647	5.00 102 618
5.00 -22 335	5.00 -22 642	5.00 150 1653	5.00 150 1660	5.00 150 1674	5.00 105 624
5.00 -22 356	5.00 -22 669	5.00 153 1680	5.00 153 1687	5.00 153 1701	5.00 108 630
5.00 -22 377	5.00 -22 696	5.00 156 1707	5.00 156 1714	5.00 156 1728	5.00 111 636
5.00 -22 398	5.00 -22 723	5.00 159 1734	5.00 159 1741	5.00 159 1755	5.00 114 642
5.00 -22 419	5.00 -22 750	5.00 162 1761	5.00 162 1768	5.00 162 1782	5.00 117 648
5.00 -22 440	5.00 -22 777	5.00 165 1788	5.00 165 1795	5.00 165 1809	5.00 120 654
5.00 -22 461	5.00 -22 804	5.00 168 1815	5.00 168 1822	5.00 168 1836	5.00 123 660
5.00 -22 482	5.00 -22 831	5.00 171 1842	5.00 171 1849	5.00 171 1863	5.00 126 666
5.00 -22 503	5.00 -22 858	5.00 174 1869	5.00 174 1876	5.00 174 1890	5.00 129 672
5.00 -22 524	5.00 -22 885	5.00 177 1896	5.00 177 1903	5.00 177 1917	5.00 132 678
5.00 -22 545	5.00 -22 912	5.00 180 1923	5.00 180 1930	5.00 180 1944	5.00 135 684
5.00 -22 566	5.00 -22 939	5.00 183 1950	5.00 183 1957	5.00 183 1971	5.00 138 690
5.00 -22 587	5.00 -22 966	5.00 186 1977	5.00 186 1984	5.00 186 1998	5.00 141 696
5.00 -22 608	5.00 -22 993	5.00 189 2004	5.00 189 2011	5.00 189 2025	5.00 144 702
5.00 -22 629	5.00 -23 020	5.00 192 2031	5.00 192 2038	5.00 192 2052	5.00 147 708
5.00 -22 650	5.00 -23 047	5.00 195 2058	5.00 195 2065	5.00 195 2079	5.00 150 714
5.00 -22 671	5.00 -23 074	5.00 198 2085	5.00 198 2092	5.00 198 2106	5.00 153 720
5.00 -22 692	5.00 -23 101	5.00 201 2112	5.00 201 2119	5.00 201 2133	5.00 156 726
5.00 -22 713	5.00 -23 128	5.00 204 2139	5.00 204 2146	5.00 204 2160	5.00 159 732
5.00 -22 734	5.00 -23 155	5.00 207 2166	5.00 207 2173	5.00 207 2187	5.00 162 738
5.00 -22 755	5.00 -23 182	5.00 210 2193	5.00 210 2200	5.00 210 2214	5.00 165 744
5.00 -22 776	5.00 -23 209	5.00 213 2220	5.00 213 2227	5.00 213 2241	5.00 168 750
5.00 -22 797	5.00 -23 236	5.00 216 2247	5.00 216 2254	5.00 216 2268	5.00 171 756
5.00 -22 818	5.00 -23 263	5.00 219 2274	5.00 219 2281	5.00 219 2295	5.00 174 762
5.00 -22 839	5.00 -23 290	5.00 222 2301	5.00 222 2308	5.00 222 2322	5.00 177 768
5.00 -22 860	5.00 -23 317	5.00 225 2328	5.00 225 2335	5.00 225 2349	5.00 180 774
5.00 -22 881	5.00 -23 344	5.00 228 2355	5.00 228 2362	5.00 228 2376	5.00 183 780
5.00 -22 902	5.00 -23 371	5.00 231 2382	5.00 231 2389	5.00 231 2403	5.00 186 786
5.00 -22 923	5.00 -23 398	5.00 234 2409	5.00 234 2416	5.00 234 2430	5.00 189 792
5.00 -22 944	5.00 -23 425	5.00 237 2436	5.00 237 2443	5.00 237 2457	5.00 192 798
5.00 -22 965	5.00 -23 452	5.00 240 2463	5.00 240 2470	5.00 240 2484	5.00 195 804
5.00 -22 986	5.00 -23 479	5.00 243 2490	5.00 243 2497	5.00 243 2511	5.00 198 810
5.00 -23 007	5.00 -23 506	5.00 246 2517	5.00 246 2524	5.00 246 2538	5.00 201 816
5.00 -23 028	5.00 -23 533	5.00 249 2544	5.00 249 2551	5.00 249 2565	5.00 204 822
5.00 -23 049	5.00 -23 560	5.00 252 2571	5.00 252 2578	5.00 252 2592	5.00 207 828
5.00 -23 070	5.00 -23 587	5.00 255 2598	5.00 255 2605	5.00 255 2619	5.00 210 834
5.00 -23 091	5.00 -23 614	5.00 258 2625	5.00 258 2632	5.00 258 2646	5.00 213 840
5.00 -23 112	5.00 -23 641	5.00 261 2652	5.00 261 2659	5.00 261 2673	5.00 216 846
5.00 -23 133	5.00 -23 668	5.00 264 2679	5.00 264 2686	5.00 264 2700	5.00 219 852
5.00 -23 154	5.00 -23 695	5.00 267 2706	5.00 267 2713	5.00 267 2727	5.00 222 858
5.00 -23 175	5.00 -23 722	5.00 270 2733	5.00 270 2740	5.00 270 2754	5.00 225 864
5.00 -23 196	5.00 -23 749	5.00 273 2760	5.00 273 2767	5.00 273 2781	5.00 228 870
5.00 -23 217	5.00 -23 776	5.00 276 2787	5.00 276 2794	5.00 276 2808	5.00 231 876
5.00 -23 238	5.00 -23 803	5.00 279 2814	5.00 279 2821	5.00 279 2835	5.00 234 882
5.00 -23 259	5.00 -23 830	5.00 282 2841	5.00 282 2848	5.00 282 2862	

ASYMPTOTIC DIRECTIONS FOR WORLD CRIO LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

[illegible]

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IGPM 1975.0)

GEOGRAPHIC LAT. = 45.00 LONG. = 90.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 45.00 LONG. = 105.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 45.00 LONG. = 120.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 45.00 LONG. = 135.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 45.00 LONG. = 150.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 45.00 LONG. = 165.00	
20.00	1 148	21.00	0 164	20.00	-1 100	20.00	-3 195	20.00	-4 208	20.00	-5 216
19.00	-1 150	19.00	-3 166	19.00	-5 102	19.00	-6 197	19.00	-8 210	19.00	-8 220
18.00	-4 152	18.00	-6 168	18.00	-8 104	18.00	-10 199	18.00	-11 212	18.00	-12 222
17.00	-7 154	17.00	-9 170	17.00	-11 106	17.00	-14 202	17.00	-16 214	17.00	-16 224
16.00	-11 157	16.00	-13 174	16.00	-15 109	16.00	-18 205	16.00	-20 216	16.00	-20 227
15.00	-14 159	15.00	-16 176	15.00	-18 111	15.00	-22 208	15.00	-24 218	15.00	-24 231
14.00	-18 161	14.00	-19 178	14.00	-22 113	14.00	-26 211	14.00	-28 220	14.00	-28 234
13.00	-22 163	13.00	-23 180	13.00	-25 115	13.00	-29 213	13.00	-31 223	13.00	-32 241
12.00	-26 165	12.00	-27 182	12.00	-29 117	12.00	-33 215	12.00	-35 225	12.00	-36 283
11.00	-30 167	11.00	-31 184	11.00	-33 119	11.00	-37 217	11.00	-39 227	11.00	-40 265
10.00	-34 169	10.00	-35 186	10.00	-37 121	10.00	-41 219	10.00	-43 229	10.00	-44 279
9.00	-38 171	9.00	-39 188	9.00	-41 123	9.00	-45 221	9.00	-47 231	9.00	-48 291
8.00	-42 173	8.00	-43 190	8.00	-45 125	8.00	-49 223	8.00	-51 233	8.00	-52 311
7.00	-46 175	7.00	-47 192	7.00	-49 127	7.00	-53 225	7.00	-55 235	7.00	-56 314
6.00	-50 177	6.00	-51 194	6.00	-53 129	6.00	-57 227	6.00	-59 237	6.00	-60 317
5.00	-54 179	5.00	-55 196	5.00	-57 131	5.00	-61 229	5.00	-63 239	5.00	-64 320
4.00	-58 181	4.00	-59 198	4.00	-61 133	4.00	-65 231	4.00	-67 241	4.00	-68 324
3.00	-62 183	3.00	-63 200	3.00	-65 135	3.00	-69 233	3.00	-71 243	3.00	-72 328
2.00	-66 185	2.00	-67 202	2.00	-69 137	2.00	-73 235	2.00	-75 245	2.00	-76 332
1.00	-70 187	1.00	-71 204	1.00	-73 139	1.00	-77 237	1.00	-79 247	1.00	-80 336
0.00	-74 189	0.00	-75 206	0.00	-77 141	0.00	-81 239	0.00	-83 249	0.00	-84 340
-1.00	-78 191	-1.00	-79 208	-1.00	-81 143	-1.00	-85 241	-1.00	-87 251	-1.00	-88 344
-2.00	-82 193	-2.00	-83 210	-2.00	-85 145	-2.00	-89 243	-2.00	-91 253	-2.00	-92 348
-3.00	-86 195	-3.00	-87 212	-3.00	-89 147	-3.00	-93 245	-3.00	-95 255	-3.00	-96 352
-4.00	-90 197	-4.00	-89 214	-4.00	-93 149	-4.00	-97 247	-4.00	-99 257	-4.00	-100 356
-5.00	-94 199	-5.00	-91 216	-5.00	-97 151	-5.00	-101 249	-5.00	-103 259	-5.00	-104 360
-6.00	-98 201	-6.00	-95 218	-6.00	-101 153	-6.00	-105 251	-6.00	-107 261	-6.00	-108 364
-7.00	-102 203	-7.00	-99 220	-7.00	-105 155	-7.00	-109 253	-7.00	-111 263	-7.00	-112 368
-8.00	-106 205	-8.00	-103 222	-8.00	-109 157	-8.00	-113 255	-8.00	-115 265	-8.00	-116 372
-9.00	-110 207	-9.00	-107 224	-9.00	-113 159	-9.00	-117 257	-9.00	-119 267	-9.00	-120 376
-10.00	-114 209	-10.00	-111 226	-10.00	-117 161	-10.00	-121 259	-10.00	-123 269	-10.00	-124 380
-11.00	-118 211	-11.00	-115 228	-11.00	-121 163	-11.00	-125 261	-11.00	-127 271	-11.00	-128 384
-12.00	-122 213	-12.00	-119 230	-12.00	-125 165	-12.00	-129 263	-12.00	-131 273	-12.00	-132 388
-13.00	-126 215	-13.00	-123 232	-13.00	-129 167	-13.00	-133 265	-13.00	-135 275	-13.00	-136 392
-14.00	-130 217	-14.00	-127 234	-14.00	-133 169	-14.00	-137 267	-14.00	-139 277	-14.00	-140 396
-15.00	-134 219	-15.00	-131 236	-15.00	-137 171	-15.00	-141 269	-15.00	-143 279	-15.00	-144 400
-16.00	-138 221	-16.00	-135 238	-16.00	-141 173	-16.00	-145 271	-16.00	-147 281	-16.00	-148 404
-17.00	-142 223	-17.00	-139 240	-17.00	-145 175	-17.00	-149 273	-17.00	-151 283	-17.00	-152 408
-18.00	-146 225	-18.00	-143 242	-18.00	-149 177	-18.00	-153 275	-18.00	-155 285	-18.00	-156 412
-19.00	-150 227	-19.00	-147 244	-19.00	-153 179	-19.00	-157 277	-19.00	-159 287	-19.00	-160 416
-20.00	-154 229	-20.00	-151 246	-20.00	-157 181	-20.00	-161 279	-20.00	-163 289	-20.00	-164 420

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 45.00 LONG. = 100.00			GEOGRAPHIC LAT. = 45.00 LONG. = 195.00			GEOGRAPHIC LAT. = 45.00 LONG. = 210.00			GEOGRAPHIC LAT. = 45.00 LONG. = 225.00			GEOGRAPHIC LAT. = 45.00 LONG. = 240.00			GEOGRAPHIC LAT. = 45.00 LONG. = 255.00		
RIG ASYMPTOTIC (GV) LAT LONG			RIG ASYMPTOTIC (GV) LAT LONG			RIG ASYMPTOTIC (GV) LAT LONG			RIG ASYMPTOTIC (GV) LAT LONG			RIG ASYMPTOTIC (GV) LAT LONG			RIG ASYMPTOTIC (GV) LAT LONG		
20.00	-4 220	19.00	-1 -123	20.00	-1 -113	20.00	2 -102	20.00	6 -90	20.00	12 -75	20.00	18 -75	20.00	24 -60		
19.00	-6 229	18.00	-6 -122	19.00	-4 -112	19.00	0 -102	19.00	4 -90	19.00	10 -75	19.00	16 -75	19.00	22 -60		
18.00	-11 231	17.00	-1 -121	18.00	-7 -112	18.00	-3 -102	18.00	2 -89	18.00	8 -75	18.00	14 -75	18.00	20 -60		
17.00	-15 232	16.00	-15 -120	17.00	-10 -111	17.00	-6 -101	17.00	0 -89	17.00	6 -75	17.00	12 -75	17.00	18 -60		
16.00	-19 234	15.00	-17 -118	16.00	-13 -110	16.00	-8 -101	16.00	-3 -89	16.00	4 -75	16.00	10 -75	16.00	16 -60		
15.00	-23 237	14.00	-20 -117	15.00	-17 -109	15.00	-11 -101	15.00	-5 -90	15.00	2 -75	15.00	8 -75	15.00	14 -60		
14.00	-27 241	13.00	-24 -114	14.00	-20 -108	14.00	-14 -100	14.00	-7 -90	14.00	0 -76	14.00	6 -76	14.00	12 -60		
13.00	-31 246	12.00	-28 -111	13.00	-23 -107	13.00	-17 -100	13.00	-10 -90	13.00	-2 -76	13.00	0 -76	13.00	10 -60		
12.00	-35 253	11.00	-32 -109	12.00	-27 -105	12.00	-20 -99	12.00	-12 -90	12.00	-4 -76	12.00	2 -76	12.00	8 -60		
11.00	-39 263	10.00	-34 -101	11.00	-29 -102	11.00	-22 -98	11.00	-15 -89	11.00	-5 -77	11.00	3 -77	11.00	11 -60		
10.00	-43 273	9.00	-34 -94	10.00	-30 -98	10.00	-23 -97	10.00	-15 -89	10.00	-6 -76	10.00	5 -76	10.00	13 -60		
9.00	-47 284	8.00	-35 -87	9.00	-31 -94	9.00	-24 -94	9.00	-15 -88	9.00	-7 -75	9.00	7 -75	9.00	15 -60		
8.00	-51 296	7.00	-35 -78	8.00	-31 -84	8.00	-24 -90	8.00	-16 -85	8.00	-8 -75	8.00	9 -75	8.00	17 -60		
7.00	-55 308	6.00	-30 -64	7.00	-29 -77	7.00	-26 -82	7.00	-19 -79	7.00	-11 -68	7.00	11 -68	7.00	19 -60		
6.00	-59 319	5.00	-28 -62	6.00	-28 -64	6.00	-26 -86	6.00	-31 -54	6.00	-16 -62	6.00	13 -62	6.00	21 -60		
5.00	-63 322	4.00	-23 -58	5.00	-26 -54	5.00	-26 -86	5.00	-37 -37	5.00	-26 -55	5.00	15 -62	5.00	23 -60		
4.00	-67 326	3.00	-23 -58	4.00	-21 -46	4.00	-26 -83	4.00	-37 -37	4.00	-27 -66	4.00	17 -66	4.00	25 -60		
3.00	-71 331	2.00	-22 -55	3.00	-15 13	3.00	-29 -35	3.00	-29 -35	3.00	-28 -16	3.00	19 -66	3.00	27 -60		
2.00	-75 337	1.00	-21 -52	2.00	21 32	2.00	-29 -35	2.00	-29 -35	2.00	-28 -16	2.00	21 -66	2.00	29 -60		
1.00	-79 343	0.00	-20 -49	1.00	18 64	1.00	-26 -84	1.00	-26 -84	1.00	-27 -67	1.00	23 -67	1.00	31 -60		
0.00	-83 349	-1.00	-17 -46	0.00	14 74	0.00	-21 -84	0.00	-26 -84	0.00	-28 -11	0.00	25 -67	0.00	33 -60		
-1.00	-87 355	-2.00	-15 -38	-1.00	12 79	-1.00	-19 -83	-1.00	-26 -83	-1.00	-28 -13	-1.00	27 -67	-1.00	35 -60		
-2.00	-91 361	-3.00	-13 -34	-2.00	9 85	-2.00	-16 -83	-2.00	-22 -82	-2.00	-28 -13	-2.00	29 -67	-2.00	37 -60		
-3.00	-95 367	-4.00	-10 -28	-3.00	5 92	-3.00	-13 -83	-3.00	-22 -82	-3.00	-28 -13	-3.00	31 -67	-3.00	39 -60		
-4.00	-99 373	-5.00	-6 -22	-4.00	1 101	-4.00	-10 -80	-4.00	-22 -82	-4.00	-28 -13	-4.00	33 -67	-4.00	41 -60		
-5.00	-103 379	-6.00	-2 -15	-5.00	-3 112	-5.00	-8 -80	-5.00	-22 -82	-5.00	-28 -13	-5.00	35 -67	-5.00	43 -60		
-6.00	-107 385	-7.00	4 -6	-6.00	-7 128	-6.00	-5 -77	-6.00	-22 -82	-6.00	-28 -13	-6.00	37 -67	-6.00	45 -60		
-7.00	-111 391	-8.00	11 6	-7.00	-15 198	-7.00	3 3	-7.00	-22 -82	-7.00	-28 -13	-7.00	39 -67	-7.00	47 -60		
-8.00	-115 397	-9.00	17 27	-8.00	-10 280	-8.00	14 23	-8.00	-22 -82	-8.00	-28 -13	-8.00	41 -67	-8.00	49 -60		
-9.00	-119 403	-10.00	12 72	-9.00	-17 246	-9.00	21 44	-9.00	-22 -82	-9.00	-28 -13	-9.00	43 -67	-9.00	51 -60		
-10.00	-123 409	-11.00	8 80	-10.00	-17 246	-10.00	10 101	-10.00	-22 -82	-10.00	-28 -13	-10.00	45 -67	-10.00	53 -60		
-11.00	-127 415	-12.00	5 184	-11.00	-17 246	-11.00	4 114	-11.00	-22 -82	-11.00	-28 -13	-11.00	47 -67	-11.00	55 -60		
-12.00	-131 421	-13.00	1 184	-12.00	-17 246	-12.00	-4 114	-12.00	-22 -82	-12.00	-28 -13	-12.00	49 -67	-12.00	57 -60		
-13.00	-135 427	-14.00	-3 125	-13.00	-17 246	-13.00	-7 176	-13.00	-22 -82	-13.00	-28 -13	-13.00	51 -67	-13.00	59 -60		
-14.00	-139 433	-15.00	-7 304	-14.00	-17 246	-14.00	-6 323	-14.00	-22 -82	-14.00	-28 -13	-14.00	53 -67	-14.00	61 -60		
-15.00	-143 439	-16.00	-7 304	-15.00	-17 246	-15.00	-5 323	-15.00	-22 -82	-15.00	-28 -13	-15.00	55 -67	-15.00	63 -60		
-16.00	-147 445	-17.00	-7 304	-16.00	-17 246	-16.00	-5 323	-16.00	-22 -82	-16.00	-28 -13	-16.00	57 -67	-16.00	65 -60		
-17.00	-151 451	-18.00	-7 304	-17.00	-17 246	-17.00	-5 323	-17.00	-22 -82	-17.00	-28 -13	-17.00	59 -67	-17.00	67 -60		
-18.00	-155 457	-19.00	-7 304	-18.00	-17 246	-18.00	-5 323	-18.00	-22 -82	-18.00	-28 -13	-18.00	61 -67	-18.00	69 -60		
-19.00	-159 463	-20.00	-7 304	-19.00	-17 246	-19.00	-5 323	-19.00	-22 -82	-19.00	-28 -13	-19.00	63 -67	-19.00	71 -60		
-20.00	-163 469	-21.00	-7 304	-20.00	-17 246	-20.00	-5 323	-20.00	-22 -82	-20.00	-28 -13	-20.00	65 -67	-20.00	73 -60		

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = 40.00			LAT. = 40.00			LAT. = 40.00			LAT. = 40.00		
LONG. = 3.00			LONG. = 30.00			LONG. = 45.00			LONG. = 60.00		
RIG ASYMPTOTIC			RIG ASYMPTOTIC			RIG ASYMPTOTIC			RIG ASYMPTOTIC		
(GV) LAT LONG			(GV) LAT LONG			(GV) LAT LONG			(GV) LAT LONG		
20.00	5	65	20.00	1	94	20.00	-1	109	20.00	-3	126
19.00	2	47	19.00	-2	96	19.00	-4	112	19.00	-5	128
18.00	-1	68	18.00	-5	99	18.00	-7	115	18.00	-8	132
17.00	-4	71	17.00	-8	103	17.00	-9	114	17.00	-11	136
16.00	-8	74	16.00	-11	107	16.00	-13	123	16.00	-14	141
15.00	-11	79	15.00	-14	112	15.00	-15	124	15.00	-16	147
14.00	-14	84	14.00	-16	115	14.00	-16	125	14.00	-17	155
13.00	-16	91	13.00	-18	119	13.00	-18	126	13.00	-18	165
12.00	-16	99	12.00	-18	127	12.00	-18	126	12.00	-17	177
11.00	-14	110	11.00	-14	137	11.00	-13	156	11.00	-12	191
10.00	-6	127	10.00	-8	149	10.00	-6	164	10.00	-1	191
9.00	6	137	9.00	3	164	9.00	6	166	9.00	10	213
8.00	16	144	8.00	16	179	8.00	16	177	8.00	11	216
7.00	19	164	7.00	17	193	7.00	16	227	7.00	12	219
6.00	20	171	6.00	18	197	6.00	16	227	6.00	13	223
5.00	20	174	5.00	17	174	5.00	14	233	5.00	14	226
4.00	20	176	4.00	17	174	4.00	12	240	4.00	14	231
3.00	19	184	3.00	16	213	3.00	8	247	3.00	14	235
2.00	18	191	2.00	15	219	2.00	4	256	2.00	14	240
1.00	16	196	1.00	14	226	1.00	-1	267	1.00	13	246
0.00	13	206	0.00	10	234	0.00	-17	267	0.00	11	252
-1.00	7	219	-1.00	4	244	-1.00	-29	270	-1.00	9	259
-2.00	-3	234	-2.00	-5	256	-2.00	-28	277	-2.00	8	263
-3.00	-19	263	-3.00	-19	275	-3.00	-27	285	-3.00	8	267
-4.00	-21	268	-4.00	-24	332	-4.00	-24	343	-4.00	-2	277
-5.00	-22	273	-5.00	-17	264	-5.00	-24	343	-5.00	-11	289
-6.00	-24	281	-6.00	-13	264	-6.00	-19	353	-6.00	-24	310
-7.00	-25	289	-7.00	-13	267	-7.00	-18	353	-7.00	-17	366
-8.00	-24	300	-8.00	-21	270	-8.00	-10	365	-8.00	-9	376
-9.00	-24	316	-9.00	-21	274	-9.00	6	381	-9.00	-9	376
-10.00	-23	333	-10.00	-24	279	-10.00	8	424	-10.00	-15	413
-11.00	-21	367	-11.00	-24	284	-11.00	8	424	-11.00	-15	413
-12.00	-19	401	-12.00	-27	291	-12.00	8	424	-12.00	-15	413
-13.00	-17	437	-13.00	-27	296	-13.00	8	424	-13.00	-15	413
-14.00	-15	471	-14.00	-24	318	-14.00	8	424	-14.00	-15	413
-15.00	-13	507	-15.00	-24	347	-15.00	8	424	-15.00	-15	413
-16.00	-12	547	-16.00	-24	378	-16.00	8	424	-16.00	-15	413
-17.00	-11	591	-17.00	-24	413	-17.00	8	424	-17.00	-15	413
-18.00	-10	641	-18.00	-24	451	-18.00	8	424	-18.00	-15	413
-19.00	-9	691	-19.00	-24	491	-19.00	8	424	-19.00	-15	413
-20.00	-8	741	-20.00	-24	531	-20.00	8	424	-20.00	-15	413

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = 40.00 LONG. = 90.00			LAT. = 40.00 LONG. = 128.00			LAT. = 40.00 LONG. = 135.00			LAT. = 40.00 LONG. = 150.00			LAT. = 40.00 LONG. = 165.00		
RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC	
(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG	
28.80	-7 159		20.00	-9 190		20.00	-10 204		20.00	-11 216		20.00	-11 226	
19.00	-10 162		19.00	-12 194		19.00	-14 208		19.00	-14 219		19.00	-15 229	
18.00	-13 168		18.00	-16 196		18.00	-18 212		18.00	-19 223		18.00	-19 232	
17.00	-16 171		17.00	-20 203		17.00	-22 217		17.00	-23 228		17.00	-23 238	
16.00	-18 177		16.00	-23 210		16.00	-25 224		16.00	-27 235		16.00	-27 242	
15.00	-20 185		15.00	-25 219		15.00	-26 234		15.00	-30 244		15.00	-31 252	
14.00	-20 195		14.00	-25 232		14.00	-29 247		14.00	-32 257		14.00	-34 260	
13.00	-17 207		13.00	-31 247		13.00	-34 264		13.00	-38 273		13.00	-39 275	
12.00	-9 222		12.00	-10 267		12.00	-10 286		12.00	-16 294		12.00	-26 293	
11.00	3 243		11.00	7 308		11.00	-6 291		11.00	8 327		11.00	-7 314	
10.98	5 246		11.00	8 308		11.00	-6 291		10.98	11 333		10.98	-5 316	
10.98	6 249		10.98	9 312		10.98	-6 294		10.98	12 340		10.98	-5 319	
10.70	7 252		10.70	8 313		10.70	-6 297		10.70	13 349		10.70	-5 322	
10.60	8 256		10.60	6 329		10.60	0 301		10.60	12 360		10.60	3 328	
10.50	9 268		10.50	3 339		10.50	3 304		10.50	8 375		10.50	6 330	
10.48	10 264		10.40	-4 354		10.40	5 309		10.40	-1 395		10.40	9 334	
10.38	10 269		10.38	-13 376		10.38	7 314		10.38	-7 439		10.38	11 340	
10.20	10 274		10.20	-6 423		10.20	9 320		10.20	-5 447		10.20	13 346	
10.18	9 280		10.18	-2 325		10.18	10 327		10.20	-2 456		10.10	15 354	
10.00	7 287		10.00	-1 338		10.00	10 336		10.20	-5 468		10.00	15 363	
9.98	4 295		9.98	-13 368		10.00	9 346		10.20	14 466		9.98	13 375	
9.80	0 304		9.80	-10 406		10.00	5 359		10.20	22 523		9.80	8 390	
9.78	-7 315		9.78	-4 414		10.00	-3 377		10.20	-11 630		9.70	-1 412	
9.60	17 331		9.78	5 422		10.50	-11 411		9.69	-2 415		9.69	-2 415	
9.58	-25 363		9.78	17 433		10.49	-11 416		9.68	-3 418		9.68	-3 418	
9.49	-24 368		9.76	32 456		10.48	-10 422		9.67	-4 422		9.67	-4 422	
9.48	-23 374		9.75	4 511		10.47	-8 429		9.66	-5 426		9.66	-5 426	
9.47	-21 379		9.74	1 475		10.46	-5 437		9.65	-6 430		9.65	-6 430	
9.45	-17 386		9.73	11 488		10.45	0 447		9.64	-7 435		9.64	-7 435	
9.44	-13 393		9.72	2 498		10.44	20 477		9.63	-7 441		9.63	-7 441	
9.43	5 409					10.43	20 477		9.62	-8 447		9.62	-8 447	
9.42	20 422					10.42	24 517		9.61	-5 454		9.61	-5 454	
9.41	34 457					10.41	1 560		9.60	-3 463		9.60	-3 463	
9.40	3 592					10.40	-2 506		9.59	1 474		9.59	1 474	
9.39	-1 593					10.39	6 458		9.58	8 489		9.58	8 489	
9.38	R					10.38	R		9.57	17 514		9.57	17 514	
									9.56	-5 580		9.56	-5 580	
									9.55	R		9.55	R	

TABLE A: (CONTINUED)

[illegible]

TABLE A1 (CONTINUED)

5FC 3AP MYC

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CORRELATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = 35.00 LONG. = 270.00			LAT. = 35.00 LONG. = 285.00			LAT. = 35.00 LONG. = 300.00			LAT. = 35.00 LONG. = 315.00			LAT. = 35.00 LONG. = 330.00			LAT. = 35.00 LONG. = 345.00		
RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC	
(GV)	(GV)		(GV)	(GV)		(GV)	(GV)		(GV)	(GV)		(GV)	(GV)		(GV)	(GV)	
29.00	5	-27	20.00	7	-5	20.00	7	17	20.00	5	37	20.00	7	55	20.00	7	55
19.00	2	-26	19.00	5	-4	19.00	4	19	19.00	2	39	19.00	4	50	19.00	4	50
13.00	0	-25	18.00	2	-2	18.00	2	21	18.00	-1	42	18.00	-2	51	18.00	-2	51
11.00	0	-25	17.00	-1	0	17.00	-2	23	17.00	-4	45	17.00	-4	49	17.00	-4	49
13.00	-5	-22	16.00	-3	2	16.00	-5	26	16.00	-8	49	16.00	-8	53	16.00	-8	53
15.00	-1	-21	15.00	-7	4	15.00	-8	30	15.00	-11	54	15.00	-11	58	15.00	-11	58
15.00	-8	-21	14.00	-10	6	14.00	-12	33	14.00	-14	60	14.00	-14	64	14.00	-14	64
15.00	-11	-19	14.00	-13	9	14.00	-15	36	14.00	-16	68	14.00	-16	72	14.00	-16	72
16.00	-14	-18	13.00	-15	12	13.00	-17	39	13.00	-18	78	13.00	-18	82	13.00	-18	82
17.00	-17	-16	12.00	-18	15	12.00	-20	42	12.00	-21	89	12.00	-21	93	12.00	-21	93
17.00	-14	-14	11.00	-17	18	11.00	-19	45	11.00	-20	92	11.00	-20	96	11.00	-20	96
18.00	-14	-14	10.00	-18	15	10.00	-20	48	10.00	-21	95	10.00	-21	99	10.00	-21	99
19.00	-20	-11	9.00	-18	21	9.00	-20	51	9.00	-21	98	9.00	-21	102	9.00	-21	102
19.00	-20	-7	8.00	-16	25	8.00	-18	54	8.00	-19	101	8.00	-19	105	8.00	-19	105
19.00	-20	-7	7.00	-14	31	7.00	-16	57	7.00	-17	104	7.00	-17	108	7.00	-17	108
19.00	-19	-1	6.00	-11	46	6.00	-13	60	6.00	-14	107	6.00	-14	111	6.00	-14	111
19.00	-14	13	5.00	-11	49	5.00	-13	63	5.00	-14	110	5.00	-14	114	5.00	-14	114
19.00	-14	13	4.00	-10	51	4.00	-12	66	4.00	-13	113	4.00	-13	117	4.00	-13	117
19.00	12	68	3.00	-10	54	3.00	-12	69	3.00	-13	116	3.00	-13	120	3.00	-13	120
19.00	15	72	2.00	-9	57	2.00	-11	72	2.00	-12	119	2.00	-12	123	2.00	-12	123
19.00	16	77	1.00	-8	60	1.00	-10	75	1.00	-11	122	1.00	-11	126	1.00	-11	126
19.00	21	84	0.00	-6	60	0.00	-8	78	0.00	-9	125	0.00	-9	129	0.00	-9	129
19.00	21	84	0.00	-5	60	0.00	-7	81	0.00	-8	128	0.00	-8	132	0.00	-8	132
19.00	21	84	0.00	-4	60	0.00	-6	84	0.00	-7	131	0.00	-7	135	0.00	-7	135
19.00	21	84	0.00	-3	60	0.0											

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 30.00 LONG. = 90.00			GEOGRAPHIC LAT. = 30.00 LONG. = 105.00			GEOGRAPHIC LAT. = 30.00 LONG. = 120.00			GEOGRAPHIC LAT. = 30.00 LONG. = 135.00			GEOGRAPHIC LAT. = 30.00 LONG. = 150.00			GEOGRAPHIC LAT. = 30.00 LONG. = 165.00		
RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC	
(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG
-14	180		21.00	-16	203	20.00	-17	216	20.00	-18	227	20.00	-19	236	20.00	-19	244
-16	197		13.00	-14	212	19.00	-19	224	19.00	-21	234	19.00	-21	242	19.00	-22	250
-17	208		11.00	-13	223	18.00	-21	235	18.00	-23	244	18.00	-24	251	18.00	-25	257
-15	223		17.00	-17	236	17.00	-21	250	17.00	-24	258	17.00	-26	263	17.00	-28	267
-8	244		15.00	-11	260	16.00	-16	270	16.00	-21	277	16.00	-26	279	16.00	-29	290
-7	246		13.00	-13	262	15.00	-15	273	15.00	-9	305	15.00	-19	302	15.00	-26	298
-6	249		13.00	-8	265	15.00	-14	276	14.00	-7	309	14.00	-17	304	14.00	-23	323
-5	252		13.00	-7	268	15.00	-12	278	14.00	-5	313	14.00	-16	307	13.00	-11	326
-3	255		13.00	-6	272	15.00	-11	281	14.00	-2	318	14.00	-14	310	13.00	-8	330
0	259		13.00	-4	275	15.00	-10	285	14.00	1	323	14.00	-12	314	13.00	-6	333
0	263		13.00	-3	279	15.00	-8	288	14.00	3	330	14.00	-10	317	13.00	-3	337
1	267		13.00	-1	284	15.00	-6	292	14.00	6	338	14.00	-8	321	13.00	0	342
3	272		13.00	1	289	15.00	-5	296	14.00	8	348	14.00	-5	325	13.00	4	347
4	277		13.00	2	294	15.00	-3	300	14.00	9	362	14.00	-2	329	13.00	6	353
5	284		13.00	4	301	15.00	-1	305	14.00	7	383	14.00	1	335	13.00	11	361
6	291		14.00	5	308	14.00	2	311	14.00	-1	424	14.00	4	341	13.00	15	372
6	300		14.00	5	318	14.00	4	318	13.00	-2	432	13.00	7	348	13.00	17	386
4	311		14.00	4	330	14.00	5	327	13.00	-2	442	13.00	11	358	12.00	14	408
-11	326		14.00	-1	348	14.00	6	337	13.00	-1	455	13.00	13	371	12.00	14	411
-11	350		14.00	-10	377	14.00	8	352	13.00	-1	473	13.00	12	391	12.00	13	414
-12	354		14.00	-11	382	14.00	5	352	13.00	1	473	13.00	12	408	12.00	12	418
-14	357		14.00	-11	387	14.00	1	374	13.00	11	507	13.00	12	421	12.00	11	421
-15	367		14.00	-11	393	14.00	0	377	13.00	R	R	13.00	12	434	12.00	10	425
-16	368		14.00	-12	393	14.00	-1	380	13.00	-1	441	13.00	1	441	12.00	8	429
-16	366		14.00	-12	400	14.00	-1	383	13.00	-1	451	13.00	-1	451	12.00	7	436
-17	372		14.00	-10	408	14.00	-2	387	13.00	-1	462	13.00	0	479	12.00	5	448
-17	378		14.00	-7	418	14.00	-3	391	13.00	-1	479	13.00	4	508	12.00	3	466
-17	385		14.00	-2	430	14.00	-4	396	13.00	-1	493	13.00	12	493	12.00	1	483
-16	394		14.00	9	447	14.00	-5	401	13.00	-1	508	13.00	12	508	12.00	-3	479
-13	411		14.00	25	480	14.00	-6	407	13.00	-1	523	13.00	12	523	12.00	-3	492
-12	403		14.00	10	559	14.00	-6	414	13.00	-1	538	13.00	12	538	12.00	-3	492
-5	415		14.00	R	R	14.00	-4	432	13.00	-1	553	13.00	12	553	12.00	2	524
-16	39		14.00	14 278		14.00	-4	446	13.00	-1	568	13.00	12	568	12.00	R	R
-16	38		14.00	14 277		14.00	7	463	13.00	-1	583	13.00	12	583	12.00	R	R
-16	36		14.00	14 266		14.00	19	508	13.00	-1	598	13.00	12	598	12.00	R	R
-16	36		14.00	14 255		14.00	19	508	13.00	-1	613	13.00	12	613	12.00	R	R

ASYMPTOTIC DIRECTIONS FOR MORPHEIC LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

[illegible]

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IGR00M 1975.01)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT.	LONG.	LAT.	LONG.	LAT.	LONG.	LAT.	LONG.	LAT.	LONG.	LAT.	LONG.	LAT.	LONG.	LAT.	LONG.	LAT.	LONG.
25.00	0.00	25.00	0.00	25.00	0.00	25.00	0.00	25.00	0.00	25.00	0.00	25.00	0.00	25.00	0.00	25.00	0.00
23.00	-5.107	23.00	-7.123	23.00	-8.145	23.00	-10.165	23.00	-11.186	23.00	-12.207	23.00	-13.228	23.00	-14.249	23.00	-15.270
19.00	-7.116	19.00	-9.135	19.00	-11.154	19.00	-13.173	19.00	-15.192	19.00	-17.211	19.00	-19.230	19.00	-21.249	19.00	-23.268
15.00	-9.123	15.00	-11.142	15.00	-13.161	15.00	-15.180	15.00	-17.199	15.00	-19.218	15.00	-21.237	15.00	-23.256	15.00	-25.275
11.00	-11.130	11.00	-13.149	11.00	-15.168	11.00	-17.187	11.00	-19.206	11.00	-21.225	11.00	-23.244	11.00	-25.263	11.00	-27.282
7.00	-13.137	7.00	-15.156	7.00	-17.175	7.00	-19.194	7.00	-21.213	7.00	-23.232	7.00	-25.251	7.00	-27.270	7.00	-29.289
3.00	-15.144	3.00	-17.163	3.00	-19.182	3.00	-21.201	3.00	-23.220	3.00	-25.239	3.00	-27.258	3.00	-29.277	3.00	-31.296
-1.00	-17.151	-1.00	-19.170	-1.00	-21.189	-1.00	-23.208	-1.00	-25.227	-1.00	-27.246	-1.00	-29.265	-1.00	-31.284	-1.00	-33.303
-5.00	-19.158	-5.00	-21.177	-5.00	-23.196	-5.00	-25.215	-5.00	-27.234	-5.00	-29.253	-5.00	-31.272	-5.00	-33.291	-5.00	-35.310
-9.00	-21.165	-9.00	-23.184	-9.00	-25.203	-9.00	-27.222	-9.00	-29.241	-9.00	-31.260	-9.00	-33.279	-9.00	-35.288	-9.00	-37.307
-13.00	-23.172	-13.00	-25.191	-13.00	-27.210	-13.00	-29.229	-13.00	-31.248	-13.00	-33.267	-13.00	-35.286	-13.00	-37.305	-13.00	-39.324
-17.00	-25.179	-17.00	-27.198	-17.00	-29.217	-17.00	-31.236	-17.00	-33.255	-17.00	-35.274	-17.00	-37.293	-17.00	-39.312	-17.00	-41.331
-21.00	-27.186	-21.00	-29.205	-21.00	-31.224	-21.00	-33.243	-21.00	-35.262	-21.00	-37.281	-21.00	-39.300	-21.00	-41.320	-21.00	-43.339
-25.00	-29.193	-25.00	-31.212	-25.00	-33.231	-25.00	-35.250	-25.00	-37.269	-25.00	-39.278	-25.00	-41.297	-25.00	-43.318	-25.00	-45.337
-29.00	-31.200	-29.00	-33.219	-29.00	-35.238	-29.00	-37.257	-29.00	-39.276	-29.00	-41.295	-29.00	-43.316	-29.00	-45.335	-29.00	-47.334
-33.00	-33.207	-33.00	-35.226	-33.00	-37.245	-33.00	-39.264	-33.00	-41.283	-33.00	-43.302	-33.00	-45.324	-33.00	-47.342	-33.00	-49.341
-37.00	-35.214	-37.00	-37.233	-37.00	-39.252	-37.00	-41.271	-37.00	-43.291	-37.00	-45.310	-37.00	-47.329	-37.00	-49.340	-37.00	-51.339
-41.00	-37.221	-41.00	-39.240	-41.00	-41.260	-41.00	-43.259	-41.00	-45.278	-41.00	-47.297	-41.00	-49.316	-41.00	-51.337	-41.00	-53.336
-45.00	-39.228	-45.00	-41.247	-45.00	-43.267	-45.00											

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 25.00 LONG. = 90.00	GEOGRAPHIC LAT. = 25.00 LONG. = 135.00	GEOGRAPHIC LAT. = 25.00 LONG. = 180.00	GEOGRAPHIC LAT. = 25.00 LONG. = 225.00	GEOGRAPHIC LAT. = 25.00 LONG. = 270.00	GEOGRAPHIC LAT. = 25.00 LONG. = 315.00
20.00	17.23	14.46	11.69	8.92	6.15
19.00	16.73	13.96	11.19	8.42	5.65
18.00	16.23	13.46	10.69	7.92	5.15
17.00	15.73	12.96	10.19	7.42	4.65
16.00	15.23	12.46	9.69	6.92	4.15
15.00	14.73	11.96	9.19	6.42	3.65
14.00	14.23	11.46	8.69	5.92	3.15
13.00	13.73	10.96	8.19	5.42	2.65
12.00	13.23	10.46	7.69	4.92	2.15
11.00	12.73	9.96	7.19	4.42	1.65
10.00	12.23	9.46	6.69	3.92	1.15
9.00	11.73	8.96	6.19	3.42	0.65
8.00	11.23	8.46	5.69	2.92	0.15
7.00	10.73	7.96	5.19	2.42	-0.35
6.00	10.23	7.46	4.69	1.92	-0.85
5.00	9.73	6.96	4.19	1.42	-1.35
4.00	9.23	6.46	3.69	0.92	-1.85
3.00	8.73	5.96	3.19	0.42	-2.35
2.00	8.23	5.46	2.69	-0.08	-2.85
1.00	7.73	4.96	2.19	-0.58	-3.35
0.00	7.23	4.46	1.69	-1.08	-3.85
-1.00	6.73	3.96	1.19	-1.58	-4.35
-2.00	6.23	3.46	0.69	-2.08	-4.85
-3.00	5.73	2.96	0.19	-2.58	-5.35
-4.00	5.23	2.46	-0.31	-3.08	-5.85
-5.00	4.73	1.96	-0.81	-3.58	-6.35
-6.00	4.23	1.46	-1.31	-4.08	-6.85
-7.00	3.73	0.96	-1.81	-4.58	-7.35
-8.00	3.23	0.46	-2.31	-5.08	-7.85
-9.00	2.73	-0.04	-2.81	-5.58	-8.35
-10.00	2.23	-0.54	-3.31	-6.08	-8.85
-11.00	1.73	-1.04	-3.81	-6.58	-9.35
-12.00	1.23	-1.54	-4.31	-7.08	-9.85
-13.00	0.73	-2.04	-4.81	-7.58	-10.35
-14.00	0.23	-2.54	-5.31	-8.08	-10.85
-15.00	-0.27	-3.04	-5.81	-8.58	-11.35
-16.00	-0.77	-3.54	-6.31	-9.08	-11.85
-17.00	-1.27	-4.04	-6.81	-9.58	-12.35
-18.00	-1.77	-4.54	-7.31	-10.08	-12.85
-19.00	-2.27	-5.04	-7.81	-10.58	-13.35
-20.00	-2.77	-5.54	-8.31	-11.08	-13.85
-21.00	-3.27	-6.04	-8.81	-11.58	-14.35
-22.00	-3.77	-6.54	-9.31	-12.08	-14.85
-23.00	-4.27	-7.04	-9.81	-12.58	-15.35
-24.00	-4.77	-7.54	-10.31	-13.08	-15.85
-25.00	-5.27	-8.04	-10.81	-13.58	-16.35
-26.00	-5.77	-8.54	-11.31	-14.08	-16.85
-27.00	-6.27	-9.04	-11.81	-14.58	-17.35
-28.00	-6.77	-9.54	-12.31	-15.08	-17.85
-29.00	-7.27	-10.04	-12.81	-15.58	-18.35
-30.00	-7.77	-10.54	-13.31	-16.08	-18.85
-31.00	-8.27	-11.04	-13.81	-16.58	-19.35
-32.00	-8.77	-11.54	-14.31	-17.08	-19.85
-33.00	-9.27	-12.04	-14.81	-17.58	-20.35
-34.00	-9.77	-12.54	-15.31	-18.08	-20.85
-35.00	-10.27	-13.04	-15.81	-18.58	-21.35
-36.00	-10.77	-13.54	-16.31	-19.08	-21.85
-37.00	-11.27	-14.04	-16.81	-19.58	-22.35
-38.00	-11.77	-14.54	-17.31	-20.08	-22.85
-39.00	-12.27	-15.04	-17.81	-20.58	-23.35
-40.00	-12.77	-15.54	-18.31	-21.08	-23.85
-41.00	-13.27	-16.04	-18.81	-21.58	-24.35
-42.00	-13.77	-16.54	-19.31	-22.08	-24.85
-43.00	-14.27	-17.04	-19.81	-22.58	-25.35
-44.00	-14.77	-17.54	-20.31	-23.08	-25.85
-45.00	-15.27	-18.04	-20.81	-23.58	-26.35
-46.00	-15.77	-18.54	-21.31	-24.08	-26.85
-47.00	-16.27	-19.04	-21.81	-24.58	-27.35
-48.00	-16.77	-19.54	-22.31	-25.08	-27.85
-49.00	-17.27	-20.04	-22.81	-25.58	-28.35
-50.00	-17.77	-20.54	-23.31	-26.08	-28.85
-51.00	-18.27	-21.04	-23.81	-26.58	-29.35
-52.00	-18.77	-21.54	-24.31	-27.08	-29.85
-53.00	-19.27	-22.04	-24.81	-27.58	-30.35
-54.00	-19.77	-22.54	-25.31	-28.08	-30.85
-55.00	-20.27	-23.04	-25.81	-28.58	-31.35
-56.00	-20.77	-23.54	-26.31	-29.08	-31.85
-57.00	-21.27	-24.04	-26.81	-29.58	-32.35
-58.00	-21.77	-24.54	-27.31	-30.08	-32.85
-59.00	-22.27	-25.04	-27.81	-30.58	-33.35
-60.00	-22.77	-25.54	-28.31	-31.08	-33.85
-61.00	-23.27	-26.04	-28.81	-31.58	-34.35
-62.00	-23.77	-26.54	-29.31	-32.08	-34.85
-63.00	-24.27	-27.04	-29.81	-32.58	-35.35
-64.00	-24.77	-27.54	-30.31	-33.08	-35.85
-65.00	-25.27	-28.04	-30.81	-33.58	-36.35
-66.00	-25.77	-28.54	-31.31	-34.08	-36.85
-67.00	-26.27	-29.04	-31.81	-34.58	-37.35
-68.00	-26.77	-29.54	-32.31	-35.08	-37.85
-69.00	-27.27	-30.04	-32.81	-35.58	-38.35
-70.00	-27.77	-30.54	-33.31	-36.08	-38.85
-71.00	-28.27	-31.04	-33.81	-36.58	-39.35
-72.00	-28.77	-31.54	-34.31	-37.08	-39.85
-73.00	-29.27	-32.04	-34.81	-37.58	-40.35
-74.00	-29.77	-32.54	-35.31	-38.08	-40.85
-75.00	-30.27	-33.04	-35.81	-38.58	-41.35
-76.00	-30.77	-33.54	-36.31	-39.08	-41.85
-77.00	-31.27	-34.04	-36.81	-39.58	-42.35
-78.00	-31.77	-34.54	-37.31	-40.08	-42.85
-79.00	-32.27	-35.04	-37.81	-40.58	-43.35
-80.00	-32.77	-35.54	-38.31	-41.08	-43.85
-81.00	-33.27	-36.04	-38.81	-41.58	-44.35
-82.00	-33.77	-36.54	-39.31	-42.08	-44.85
-83.00	-34.27	-37.04	-39.81	-42.58	-45.35
-84.00	-34.77	-37.54	-40.31	-43.08	-45.85
-85.00	-35.27	-38.04	-40.81	-43.58	-46.35
-86.00	-35.77	-38.54	-41.31	-44.08	-46.85
-87.00	-36.27	-39.04	-41.81	-44.58	-47.35
-88.00	-36.77	-39.54	-42.31	-45.08	-47.85
-89.00	-37.27	-40.04	-42.81	-45.58	-48.35
-90.00	-37.77	-40.54	-43.31	-46.08	-48.85
-91.00	-38.27	-41.04	-43.81	-46.58	-49.35
-92.00	-38.77	-41.54	-44.31	-47.08	-49.85
-93.00	-39.27	-42.04	-44.81	-47.58	-50.35
-94.00	-39.77	-42.54	-45.31	-48.08	-50.85
-95.00	-40.27	-43.04	-45.81	-48.58	-51.35
-96.00	-40.77	-43.54	-46.31	-49.08	-51.85
-97.00	-41.27	-44.04	-46.81	-49.58	-52.35
-98.00	-41.77	-44.54	-47.31	-50.08	-52.85
-99.00	-42.27	-45.04	-47.81	-50.58	-53.35
-100.00	-42.77	-45.54	-48.31	-51.08	-53.85

TABLE A1 (CONTINUED)

[illegible]

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IGRF 1975-8)

GEOGRAPHIC (LAT. = 25.00 LONG. = 270.00)		GEOGRAPHIC (LAT. = 25.00 LONG. = 300.00)		GEOGRAPHIC (LAT. = 25.00 LONG. = 330.00)		GEOGRAPHIC (LAT. = 25.00 LONG. = 360.00)	
RIG (GV)	ASYMPTOTIC LAT LONG	RIG (GV)	ASYMPTOTIC LAT LONG	RIG (GV)	ASYMPTOTIC LAT LONG	RIG (GV)	ASYMPTOTIC LAT LONG
20.00	-12 -31	20.00	-2 7	20.00	0 29	20.00	-2 70
19.00	-15 -28	19.00	-4 10	19.00	-2 33	19.00	-4 75
18.00	-17 -25	18.00	-6 14	18.00	-5 38	18.00	-7 80
17.00	-20 -22	17.00	-8 18	17.00	-6 43	17.00	-9 85
16.00	-23 -18	16.00	-10 23	16.00	-8 48	16.00	-11 90
15.00	-25 -12	15.00	-12 28	15.00	-10 53	15.00	-13 95
14.00	-27 -6	14.00	-14 33	14.00	-12 58	14.00	-15 100
13.00	-29 1	13.00	-16 38	13.00	-14 63	13.00	-17 105
12.00	-31 10	12.00	-18 43	12.00	-16 68	12.00	-19 110
11.00	-33 18	11.00	-20 48	11.00	-18 73	11.00	-21 115
10.00	-35 27	10.00	-22 53	10.00	-20 78	10.00	-23 120
9.00	-37 35	9.00	-24 58	9.00	-22 83	9.00	-25 125
8.00	-39 44	8.00	-26 63	8.00	-24 88	8.00	-27 130
7.00	-41 52	7.00	-28 68	7.00	-26 93	7.00	-29 135
6.00	-43 60	6.00	-30 73	6.00	-28 98	6.00	-31 140
5.00	-45 68	5.00	-32 78	5.00	-30 103	5.00	-33 145
4.00	-47 76	4.00	-34 83	4.00	-32 108	4.00	-35 150
3.00	-49 84	3.00	-36 88	3.00	-34 113	3.00	-37 155
2.00	-51 92	2.00	-38 93	2.00	-36 118	2.00	-39 160
1.00	-53 100	1.00	-40 98	1.00	-38 123	1.00	-41 165
0.00	-55 108	0.00	-42 103	0.00	-40 128	0.00	-43 170
-1.00	-57 116	-1.00	-44 108	-1.00	-42 133	-1.00	-45 175
-2.00	-59 124	-2.00	-46 113	-2.00	-44 138	-2.00	-47 180
-3.00	-61 132	-3.00	-48 118	-3.00	-46 143	-3.00	-49 185
-4.00	-63 140	-4.00	-50 123	-4.00	-48 148	-4.00	-51 190
-5.00	-65 148	-5.00	-52 128	-5.00	-50 153	-5.00	-53 195
-6.00	-67 156	-6.00	-54 133	-6.00	-52 158	-6.00	-55 200
-7.00	-69 164	-7.00	-56 138	-7.00	-54 163	-7.00	-57 205
-8.00	-71 172	-8.00	-58 143	-8.00	-56 168	-8.00	-59 210
-9.00	-73 180	-9.00	-60 148	-9.00	-58 173	-9.00	-61 215
-10.00	-75 188	-10.00	-62 153	-10.00	-60 178	-10.00	-63 220
-11.00	-77 196	-11.00	-64 158	-11.00	-62 183	-11.00	-65 225
-12.00	-79 204	-12.00	-66 163	-12.00	-64 188	-12.00	-67 230
-13.00	-81 212	-13.00	-68 168	-13.00	-66 193	-13.00	-69 235
-14.00	-83 220	-14.00	-70 173	-14.00	-68 198	-14.00	-71 240
-15.00	-85 228	-15.00	-72 178	-15.00	-70 203	-15.00	-73 245
-16.00	-87 236	-16.00	-74 183	-16.00	-72 208	-16.00	-75 250
-17.00	-89 244	-17.00	-76 188	-17.00	-74 213	-17.00	-77 255
-18.00	-91 252	-18.00	-78 193	-18.00	-76 218	-18.00	-79 260
-19.00	-93 260	-19.00	-80 198	-19.00	-78 223	-19.00	-81 265
-20.00	-95 268	-20.00	-82 203	-20.00	-80 228	-20.00	-83 270
-21.00	-97 276	-21.00	-84 208	-21.00	-82 233	-21.00	-85 275
-22.00	-99 284	-22.00	-86 213	-22.00	-84 238	-22.00	-87 280
-23.00	-101 292	-23.00	-88 218	-23.00	-86 243	-23.00	-89 285
-24.00	-103 300	-24.00	-90 223	-24.00	-88 248	-24.00	-91 290
-25.00	-105 308	-25.00	-92 228	-25.00	-90 253	-25.00	-93 295
-26.00	-107 316	-26.00	-94 233	-26.00	-92 258	-26.00	-95 300
-27.00	-109 324	-27.00	-96 238	-27.00	-94 263	-27.00	-97 305
-28.00	-111 332	-28.00	-98 243	-28.00	-96 268	-28.00	-99 310
-29.00	-113 340	-29.00	-100 248	-29.00	-98 273	-29.00	-101 315
-30.00	-115 348	-30.00	-102 253	-30.00	-100 278	-30.00	-103 320
-31.00	-117 356	-31.00	-104 258	-31.00	-102 283	-31.00	-105 325
-32.00	-119 364	-32.00	-106 263	-32.00	-104 288	-32.00	-107 330
-33.00	-121 372	-33.00	-108 268	-33.00	-106 293	-33.00	-109 335
-34.00	-123 380	-34.00	-110 273	-34.00	-108 298	-34.00	-111 340
-35.00	-125 388	-35.00	-112 278	-35.00	-110 303	-35.00	-113 345
-36.00	-127 396	-36.00	-114 283	-36.00	-112 308	-36.00	-115 350
-37.00	-129 404	-37.00	-116 288	-37.00	-114 313	-37.00	-117 355
-38.00	-131 412	-38.00	-118 293	-38.00	-116 318	-38.00	-119 360
-39.00	-133 420	-39.00	-120 298	-39.00	-118 323	-39.00	-121 365
-40.00	-135 428	-40.00	-122 303	-40.00	-120 328	-40.00	-123 370
-41.00	-137 436	-41.00	-124 308	-41.00	-122 333	-41.00	-125 375
-42.00	-139 444	-42.00	-126 313	-42.00	-124 338	-42.00	-127 380
-43.00	-141 452	-43.00	-128 318	-43.00	-126 343	-43.00	-129 385
-44.00	-143 460	-44.00	-130 323	-44.00	-128 348	-44.00	-131 390
-45.00	-145 468	-45.00	-132 328	-45.00	-130 353	-45.00	-133 395
-46.00	-147 476	-46.00	-134 333	-46.00	-132 358	-46.00	-135 400
-47.00	-149 484	-47.00	-136 338	-47.00	-134 363	-47.00	-137 405
-48.00	-151 492	-48.00	-138 343	-48.00	-136 368	-48.00	-139 410
-49.00	-153 500	-49.00	-140 348	-49.00	-138 373	-49.00	-141 415
-50.00	-155 508	-50.00	-142 353	-50.00	-140 378	-50.00	-143 420
-51.00	-157 516	-51.00	-144 358	-51.00	-142 383	-51.00	-145 425
-52.00	-159 524	-52.00	-146 363	-52.00	-144 388	-52.00	-147 430
-53.00	-161 532	-53.00	-148 368	-53.00	-146 393	-53.00	-149 435
-54.00	-163 540	-54.00	-150 373	-54.00	-148 398	-54.00	-151 440
-55.00	-165 548	-55.00	-152 378	-55.00	-150 403	-55.00	-153 445
-56.00	-167 556	-56.00	-154 383	-56.00	-152 408	-56.00	-155 450
-57.00	-169 564	-57.00	-156 388	-57.00	-154 413	-57.00	-157 455
-58.00	-171 572	-58.00	-158 393	-58.00	-156 418	-58.00	-159 460
-59.00	-173 580	-59.00	-160 398	-59.00	-158 423	-59.00	-161 465
-60.00	-175 588	-60.00	-162 403	-60.00	-160 428	-60.00	-163 470
-61.00	-177 596	-61.00	-164 408	-61.00	-162 433	-61.00	-165 475
-62.00	-179 604	-62.00	-166 413	-62.00	-164 438	-62.00	-167 480
-63.00	-181 612	-63.00	-168 418	-63.00	-166 443	-63.00	-169 485
-64.00	-183 620	-64.00	-170 423	-64.00	-168 448	-64.00	-171 490
-65.00	-185 628	-65.00	-172 428	-65.00	-170 453	-65.00	-173 495
-66.00	-187 636	-66.00	-174 433	-66.00	-172 458	-66.00	-175 500
-67.00	-189 644	-67.00	-176 438	-67.00	-174 463	-67.00	-177 505
-68.00	-191 652	-68.00	-178 443	-68.00	-176 468	-68.00	-179 510
-69.00	-193 660	-69.00	-180 448	-69.00	-178 473	-69.00	-181 515
-70.00	-195 668	-70.00	-182 453	-70.00	-180 478	-70.00	-183 520
-71.00	-197 676	-71.00	-184 458	-71.00	-182 483	-71.00	-185 525
-72.00	-199 684	-72.00	-186 463	-72.00	-184 488	-72.00	-187 530
-73.00	-201 692	-73.00	-188 468	-73.00	-186 493	-73.00	-189 535
-74.00	-203 700	-74.00	-190 473	-74.00	-188 498	-74.00	-191 540
-75.00	-205 708	-75.00	-192 478	-75.00	-190 503	-75.00	-193 545
-76.00	-207 716	-76.00	-194 483	-76.00	-192 508	-76.00	-195 550
-77.00	-209 724	-77.00	-196 488	-77.00	-194 513	-77.00	-197 555
-78.00	-211 732	-78.00	-198 493	-78.00	-196 518	-78.00	-199 560
-79.00	-213 740	-79.00	-200 498	-79.00	-198 523	-79.00	-201 565
-80.00	-215 748	-80.00	-202 503	-80.00	-200 528	-80.00	-203 570
-81.00	-217 756	-81.00	-204 508	-81.00	-202 533	-81.00	-205 575
-82.00	-219 764	-82.00	-206 513	-82.00	-204 538	-82.00	-207 580
-83.00	-221 772	-83.00	-208 518	-83.00	-206 543	-83.00	-209 585
-84.00	-223 780	-84.00	-210 523	-84.00	-208 548	-84.00	-211 590
-85.00	-225 788	-85.00	-212 528	-85.00	-210 553	-85.00	-213 595
-86.00	-227 796	-86.00	-214 533	-86.00	-212 558	-86.00	-215 600
-87.00	-229 804	-87.00	-216 538	-87.00	-214 563	-87.00	-217 605
-88.00	-231 812	-88.00	-218 543	-88.00	-216 568	-88.00	-219 610
-89.00	-233 820	-89.00	-220 548	-89.00	-218 573	-89.00	-221 615
-90.00	-235 828	-90.00	-222 553	-90.00	-220 578	-90.00	-223 620
-91.00	-237 836	-91.00	-224 558	-91.00	-222 583	-91.00	-225 625
-92.00	-239 844	-92.00	-226 563	-92.00	-224 588	-92.00	-227 630
-93.00	-241 852	-93.00	-228 568	-93.00	-226 593	-93.00	-229 635
-94.00	-243 860	-94.00	-230 573	-94.00	-228 598	-94.00	-231 640
-95.00	-245 868	-95.00	-232 578	-95.00	-230 603	-95.00	-233 645
-96.00	-247 876	-96.00	-234 583	-96.00	-232 608	-96.00	-235 650
-97.00	-249 884	-97.00	-236 588	-97.00	-234 613	-97.00	-237 655
-98.00	-251 892	-98.00	-238 593	-98.00	-236 618	-98.00	-239 660
-99.00	-253 900	-99.00	-240 598	-99.00	-238 623	-99.00	-241 665
-100.00	-255 908	-100.00	-242 603	-100.00	-240 628	-100.00	-243 670

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 20.00 LONG. = 0.00	GEOGRAPHIC LAT. = 20.00 LONG. = 30.00	GEOGRAPHIC LAT. = 20.00 LONG. = 45.00	GEOGRAPHIC LAT. = 20.00 LONG. = 60.00	GEOGRAPHIC LAT. = 20.00 LONG. = 75.00	GEOGRAPHIC LAT. = 20.00 LONG. = 90.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 -2 96	21.30 -2 125	20.00 -5 135	20.00 -6 156	20.00 -7 176	20.00 -9 208
19.00 -4 103	19.00 -2 124	19.00 -6 145	19.00 -6 166	19.00 -7 191	19.00 -8 216
18.00 -6 113	18.00 -4 135	18.00 -8 157	18.00 -8 181	18.00 -9 209	18.00 -10 239
17.00 -8 125	17.00 -6 150	17.00 -10 175	17.00 -10 204	17.00 -11 214	17.00 -12 242
16.00 -10 144	16.00 -8 173	16.00 -12 198	16.00 -12 227	16.00 -13 214	16.00 -14 266
15.00 -12 166	15.00 -10 196	15.00 -14 223	15.00 -14 252	15.00 -15 234	15.00 -16 296
14.00 -14 191	14.00 -12 221	14.00 -16 248	14.00 -16 277	14.00 -17 256	14.00 -18 328
13.00 -16 218	13.00 -14 246	13.00 -18 273	13.00 -18 302	13.00 -19 281	13.00 -20 360
12.00 -18 246	12.00 -16 271	12.00 -20 300	12.00 -20 329	12.00 -21 306	12.00 -22 392
11.00 -20 275	11.00 -18 296	11.00 -22 325	11.00 -22 354	11.00 -23 331	11.00 -24 418
10.00 -22 304	10.00 -20 321	10.00 -24 350	10.00 -24 379	10.00 -25 356	10.00 -26 452
9.00 -24 333	9.00 -22 346	9.00 -26 375	9.00 -26 404	9.00 -27 381	9.00 -28 500
8.00 -26 362	8.00 -24 371	8.00 -28 400	8.00 -28 429	8.00 -29 406	8.00 -30 539
7.00 -28 391	7.00 -26 396	7.00 -30 425	7.00 -30 454	7.00 -31 431	7.00 -32 578
6.00 -30 420	6.00 -28 421	6.00 -32 450	6.00 -32 479	6.00 -33 456	6.00 -34 617
5.00 -32 449	5.00 -30 446	5.00 -34 475	5.00 -34 504	5.00 -35 481	5.00 -36 656
4.00 -34 478	4.00 -32 471	4.00 -36 500	4.00 -36 529	4.00 -37 506	4.00 -38 695
3.00 -36 507	3.00 -34 496	3.00 -38 525	3.00 -38 554	3.00 -39 531	3.00 -40 734
2.00 -38 536	2.00 -36 521	2.00 -40 550	2.00 -40 579	2.00 -41 556	2.00 -42 773
1.00 -40 565	1.00 -38 546	1.00 -42 575	1.00 -42 604	1.00 -43 581	1.00 -44 812
0.00 -42 594	0.00 -40 571	0.00 -44 600	0.00 -44 629	0.00 -45 606	0.00 -46 851
1.00 -44 623	1.00 -42 596	1.00 -46 625	1.00 -46 654	1.00 -47 631	1.00 -48 890
2.00 -46 652	2.00 -44 621	2.00 -48 650	2.00 -48 679	2.00 -49 656	2.00 -50 929
3.00 -48 681	3.00 -46 646	3.00 -50 675	3.00 -50 704	3.00 -51 681	3.00 -52 968
4.00 -50 710	4.00 -48 671	4.00 -52 700	4.00 -52 729	4.00 -53 696	4.00 -54 1007
5.00 -52 739	5.00 -50 696	5.00 -54 725	5.00 -54 754	5.00 -55 721	5.00 -56 1046
6.00 -54 768	6.00 -52 721	6.00 -56 750	6.00 -56 779	6.00 -57 746	6.00 -58 1085
7.00 -56 797	7.00 -54 746	7.00 -58 775	7.00 -58 804	7.00 -59 771	7.00 -60 1124
8.00 -58 826	8.00 -56 771	8.00 -60 800	8.00 -60 829	8.00 -61 796	8.00 -62 1163
9.00 -60 855	9.00 -58 796	9.00 -62 825	9.00 -62 854	9.00 -63 821	9.00 -64 1202
10.00 -62 884	10.00 -60 821	10.00 -64 850	10.00 -64 879	10.00 -65 846	10.00 -66 1241
11.00 -64 913	11.00 -62 846	11.00 -66 875	11.00 -66 904	11.00 -67 871	11.00 -68 1280
12.00 -66 942	12.00 -64 871	12.00 -68 900	12.00 -68 929	12.00 -69 896	12.00 -70 1319
13.00 -68 971	13.00 -66 896	13.00 -70 925	13.00 -70 954	13.00 -71 921	13.00 -72 1358
14.00 -70 1000	14.00 -68 921	14.00 -72 950	14.00 -72 979	14.00 -73 946	14.00 -74 1397
15.00 -72 1029	15.00 -70 946	15.00 -74 975	15.00 -74 1004	15.00 -75 971	15.00 -76 1436
16.00 -74 1058	16.00 -72 971	16.00 -76 1000	16.00 -76 1029	16.00 -77 996	16.00 -78 1475
17.00 -76 1087	17.00 -74 996	17.00 -78 1025	17.00 -78 1054	17.00 -79 1021	17.00 -80 1514
18.00 -78 1116	18.00 -76 1021	18.00 -80 1050	18.00 -80 1079	18.00 -81 1046	18.00 -82 1553
19.00 -80 1145	19.00 -78 1046	19.00 -82 1075	19.00 -82 1104	19.00 -83 1071	19.00 -84 1592
20.00 -82 1174	20.00 -80 1071	20.00 -84 1100	20.00 -84 1129	20.00 -85 1096	20.00 -86 1631

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 20.00 LONG. = 90.00	GEOGRAPHIC LAT. = 20.00 LONG. = 105.00	GEOGRAPHIC LAT. = 20.00 LONG. = 120.00	GEOGRAPHIC LAT. = 20.00 LONG. = 135.00	GEOGRAPHIC LAT. = 20.00 LONG. = 150.00	GEOGRAPHIC LAT. = 20.00 LONG. = 165.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
19.98 -10 219	21.00 -12 233	20.00 -14 242	20.00 -16 249	20.00 -17 255	19.00 -21 272
19.98 -10 236	11.00 -12 249	19.00 -15 256	19.00 -17 261	19.00 -19 266	18.00 -22 283
19.98 -10 264	11.00 -1 275	18.00 -13 277	18.00 -17 278	18.00 -20 280	17.00 -21 299
19.98 -5 267	11.00 -4 278	17.00 -12 280	17.00 -12 306	17.00 -17 308	16.00 -15 323
17.00 -4 272	17.00 -7 282	17.00 -12 283	16.00 -11 309	16.00 -17 303	15.00 -13 326
17.00 -4 278	17.00 -6 286	17.00 -11 286	16.00 -10 313	16.00 -16 305	15.00 -12 329
17.00 -3 282	17.00 -6 291	17.00 -11 289	16.00 -9 310	16.00 -15 306	15.00 -11 332
17.00 -2 288	17.00 -1 296	17.00 -10 293	16.00 -7 323	16.00 -15 311	15.00 -9 336
17.00 -2 295	17.00 -1 302	17.00 -9 297	16.00 -5 326	16.00 -14 314	15.00 -7 340
17.00 -1 304	17.00 -1 309	17.00 -8 301	16.00 -3 335	16.00 -12 318	15.00 -5 344
17.00 -1 315	17.00 -2 317	17.00 -7 306	16.00 -1 343	16.00 -11 321	15.00 -3 349
17.00 -3 330	17.00 -1 326	17.00 -6 312	16.00 1 352	16.00 -10 325	15.00 0 355
17.00 -6 353	17.00 -1 342	17.00 -4 318	16.00 4 365	16.00 -8 329	15.00 2 361
16.99 -6 356	15.00 -3 363	16.00 -3 325	16.00 6 384	16.00 -6 334	15.00 6 363
16.99 -7 360	15.00 -2 408	16.00 -2 333	15.00 7 419	15.00 -4 339	14.00 9 379
16.97 -7 364	15.00 -1 417	16.00 0 344	15.00 7 425	15.00 -2 346	14.00 12 392
16.96 -8 368	15.00 -2 426	16.00 1 359	15.00 7 432	15.00 1 353	14.00 14 414
16.95 -8 373	15.00 -2 443	16.00 2 382	15.00 7 440	15.00 3 362	14.00 16 438
16.94 -8 378	15.00 -1 469	16.00 2 395	15.00 7 451	15.00 6 373	14.00 18 462
16.93 -8 384	15.00 -5 561	16.00 2 399	15.00 7 465	15.00 9 389	14.00 20 486
16.92 -8 391	15.00 -5 561	16.00 2 407	15.00 7 488	15.00 11 414	14.00 22 510
16.91 -6 400	15.00 -2 437	16.00 2 422	15.00 7 503	15.00 13 438	14.00 24 534
16.90 -4 410	15.00 -2 443	16.00 2 433	15.00 7 526	15.00 15 462	14.00 26 558
16.89 -1 424	15.00 -2 453	16.00 2 447	15.00 7 549	15.00 17 486	14.00 28 582
16.88 -1 445	15.00 -2 463	16.00 2 457	15.00 7 572	15.00 19 510	14.00 30 606
16.87 -2 458	15.00 -2 473	16.00 2 467	15.00 7 595	15.00 21 534	14.00 32 630
16.86 -2 479	15.00 -2 483	16.00 2 477	15.00 7 618	15.00 23 558	14.00 34 654

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = 15.00 LONG. = 0.00		LAT. = 15.00 LONG. = 30.00		LAT. = 15.00 LONG. = 45.00		LAT. = 15.00 LONG. = 60.00		LAT. = 15.00 LONG. = 75.00			
RIG ASYMPTOTIC (GVI) LAT LONG		RIG ASYMPTOTIC (GVI) LAT LONG		RIG ASYMPTOTIC (GVI) LAT LONG		RIG ASYMPTOTIC (GVI) LAT LONG		RIG ASYMPTOTIC (GVI) LAT LONG		RIG ASYMPTOTIC (GVI) LAT LONG	
20.00	0 100	20.00	-2 141	20.00	-2 163	20.00	-4 187	20.00	-6 210		
19.00	-1 109	19.00	-2 152	19.00	-3 176	19.00	-4 202	19.00	-5 218		
18.00	-3 128	18.00	-2 160	18.00	-2 195	18.00	-3 227	18.00	-6 232		
17.00	-3 134	17.00	-2 161	17.00	-2 197	17.00	-3 231	17.00	-6 235		
16.00	-1 138	16.00	0 195	16.00	-2 202	16.00	-2 235	16.00	-5 239		
15.00	-1 161	15.00	1 198	15.00	-2 202	15.00	-2 233	15.00	-5 241		
14.00	0 164	14.00	1 202	14.00	-1 205	14.00	-2 244	14.00	-5 244		
13.00	1 168	13.00	2 206	13.00	-1 208	13.00	-2 249	13.00	-5 248		
12.00	1 172	12.00	2 211	12.00	-1 212	12.00	-2 255	12.00	-5 252		
11.00	0 175	11.00	2 216	11.00	-1 215	11.00	-2 262	11.00	-5 256		
10.00	0 170	10.00	3 222	10.00	0 219	10.00	-2 270	10.00	-4 261		
9.00	1 181	9.00	3 229	9.00	0 224	9.00	-2 280	9.00	-4 268		
8.00	1 185	8.00	3 238	8.00	1 234	8.00	-4 293	8.00	-4 272		
7.00	1 189	7.00	3 248	7.00	1 240	7.00	-7 313	7.00	-4 279		
6.00	1 194	6.00	3 258	6.00	1 247	6.00	-12 353	6.00	-4 287		
5.00	1 199	5.00	4 262	5.00	1 256	5.00	-12 369	5.00	-4 297		
4.00	1 205	4.00	4 283	4.00	1 267	4.00	-10 380	4.00	-5 311		
3.00	1 212	3.00	15 69	3.00	0 281	3.00	-6 394	3.00	-7 332		
2.00	1 220	2.00	15 69	2.00	-3 291	2.00	-4 416	2.00	-8 375		
1.00	1 231	1.00	15 68	1.00	-9 307	1.00	23 474	1.00	-7 383		
0.00	1 244	0.00	15 66	0.00	-15 544	0.00		0.00	-5 393		
			15 64						-1 406		
									17 27		
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									16 50		

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC (G.M.) LAT. = 10.00 LONG. = 0.00	GEOGRAPHIC (G.M.) LAT. = 10.00 LONG. = 15.00	GEOGRAPHIC (G.M.) LAT. = 10.00 LONG. = 30.00	GEOGRAPHIC (G.M.) LAT. = 10.00 LONG. = 45.00	GEOGRAPHIC (G.M.) LAT. = 10.00 LONG. = 60.00	GEOGRAPHIC (G.M.) LAT. = 10.00 LONG. = 75.00
20.00 4 101	20.00 1 122	20.00 2 183	20.00 2 185	20.00 0 190	20.00 -3 210
19.00 3 110	19.00 2 132	19.00 1 154	19.00 1 179	19.00 -2 207	19.00 -5 235
18.00 1 121	18.00 1 145	18.00 1 170	18.00 0 199	18.00 -4 235	18.00 -5 250
17.00 0 137	17.00 0 164	17.00 0 196	17.00 -1 202	17.00 -6 239	17.00 -5 261
16.00 0 161	16.00 0 167	16.00 0 200	16.00 -1 205	16.00 -4 243	16.00 -5 264
15.00 0 165	15.00 0 169	15.00 0 204	15.00 -1 208	15.00 -4 249	15.00 -6 268
14.00 0 169	14.00 0 172	14.00 0 208	14.00 -1 211	14.00 -5 254	14.00 -6 272
13.00 0 173	13.00 0 175	13.00 0 213	13.00 -1 214	13.00 -5 258	13.00 -6 276
12.00 0 177	12.00 0 179	12.00 0 219	12.00 -1 216	12.00 -6 269	12.00 -7 280
11.00 0 182	11.00 0 184	11.00 0 225	11.00 -1 222	11.00 -6 279	11.00 -7 286
10.00 0 186	10.00 0 186	10.00 0 233	10.00 -2 227	10.00 -6 292	10.00 -7 292
9.00 0 190	9.00 0 190	9.00 0 242	9.00 -2 232	9.00 -6 302	9.00 -7 297
8.00 0 195	8.00 0 195	8.00 0 253	8.00 -2 238	8.00 -6 312	8.00 -7 302
7.00 0 203	7.00 0 203	7.00 0 269	7.00 -2 249	7.00 -6 326	7.00 -7 312
6.00 0 213	6.00 0 213	6.00 0 289	6.00 -2 265	6.00 -6 346	6.00 -7 326
5.00 0 226	5.00 0 226	5.00 0 300	5.00 -2 283	5.00 -6 363	5.00 -7 343
4.00 0 245	4.00 0 245	4.00 0 314	4.00 -2 304	4.00 -6 385	4.00 -7 365
3.00 0 260	3.00 0 260	3.00 0 334	3.00 -2 337	3.00 -6 411	3.00 -7 391
2.00 0 279	2.00 0 279	2.00 0 361	2.00 -2 377	2.00 -6 441	2.00 -7 421
1.00 0 293	1.00 0 293	1.00 0 399	1.00 -2 421	1.00 -6 481	1.00 -7 461
0.00 0 312	0.00 0 312	0.00 0 441	0.00 -2 471	0.00 -6 521	0.00 -7 501
-1.00 0 332	-1.00 0 332	-1.00 0 489	-1.00 -2 521	-1.00 -6 571	-1.00 -7 551
-2.00 0 353	-2.00 0 353	-2.00 0 541	-2.00 -2 571	-2.00 -6 621	-2.00 -7 601
-3.00 0 379	-3.00 0 379	-3.00 0 601	-3.00 -2 621	-3.00 -6 671	-3.00 -7 651
-4.00 0 401	-4.00 0 401	-4.00 0 661	-4.00 -2 671	-4.00 -6 721	-4.00 -7 701
-5.00 0 421	-5.00 0 421	-5.00 0 721	-5.00 -2 721	-5.00 -6 771	-5.00 -7 751
-6.00 0 441	-6.00 0 441	-6.00 0 781	-6.00 -2 771	-6.00 -6 821	-6.00 -7 801
-7.00 0 461	-7.00 0 461	-7.00 0 841	-7.00 -2 821	-7.00 -6 871	-7.00 -7 851
-8.00 0 481	-8.00 0 481	-8.00 0 901	-8.00 -2 871	-8.00 -6 921	-8.00 -7 901
-9.00 0 501	-9.00 0 501	-9.00 0 961	-9.00 -2 921	-9.00 -6 971	-9.00 -7 951
-10.00 0 521	-10.00 0 521	-10.00 0 1021	-10.00 -2 971	-10.00 -6 1021	-10.00 -7 1001
-11.00 0 541	-11.00 0 541	-11.00 0 1081	-11.00 -2 1021	-11.00 -6 1081	-11.00 -7 1061
-12.00 0 561	-12.00 0 561	-12.00 0 1141	-12.00 -2 1071	-12.00 -6 1141	-12.00 -7 1121
-13.00 0 581	-13.00 0 581	-13.00 0 1201	-13.00 -2 1121	-13.00 -6 1201	-13.00 -7 1181
-14.00 0 601	-14.00 0 601	-14.00 0 1261	-14.00 -2 1171	-14.00 -6 1261	-14.00 -7 1241
-15.00 0 621	-15.00 0 621	-15.00 0 1321	-15.00 -2 1221	-15.00 -6 1321	-15.00 -7 1301
-16.00 0 641	-16.00 0 641	-16.00 0 1381	-16.00 -2 1271	-16.00 -6 1381	-16.00 -7 1361
-17.00 0 661	-17.00 0 661	-17.00 0 1441	-17.00 -2 1321	-17.00 -6 1441	-17.00 -7 1421
-18.00 0 681	-18.00 0 681	-18.00 0 1501	-18.00 -2 1371	-18.00 -6 1501	-18.00 -7 1481
-19.00 0 701	-19.00 0 701	-19.00 0 1561	-19.00 -2 1421	-19.00 -6 1561	-19.00 -7 1541
-20.00 0 721	-20.00 0 721	-20.00 0 1621	-20.00 -2 1471	-20.00 -6 1621	-20.00 -7 1601

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC (GV) LAT LONG	GEOGRAPHIC LAT. = 10.00 LONG. = 180.00	GEOGRAPHIC LAT. = 10.00 LONG. = 210.00	GEOGRAPHIC LAT. = 10.00 LONG. = 225.00	GEOGRAPHIC LAT. = 10.00 LONG. = 240.00	GEOGRAPHIC LAT. = 10.00 LONG. = 255.00	GEOGRAPHIC LAT. = 10.00 LONG. = 270.00
18.00 -16 207	20.00 -19 -51	23.00 -19 -51	26.00 -20 -40	29.00 -20 -28	32.00 -19 -17	35.00 -18 -10
19.00 -16 207	19.00 -20 -42	19.00 -20 -42	19.00 -21 -31	19.00 -21 -20	19.00 -19 -18	19.00 -19 -18
20.00 -16 207	18.00 -19 -31	18.00 -19 -31	18.00 -20 -21	18.00 -20 -11	18.00 -19 -2	18.00 -19 -2
21.00 -16 207	17.00 -18 -16	17.00 -18 -16	17.00 -18 -8	17.00 -19 1	17.00 -18 8	17.00 -18 8
22.00 -16 207	16.00 -9 4	16.00 -9 4	16.00 -11 10	16.00 -14 19	16.00 -15 28	16.00 -15 28
23.00 -16 207	15.00 -8 7	15.00 -8 7	15.00 -4 36	15.00 -2 35	15.00 -7 36	15.00 -7 36
24.00 -16 207	14.00 -7 9	14.00 -7 9	14.00 7 49	14.00 0 30	14.00 10 58	14.00 10 58
25.00 -16 207	13.00 -5 12	13.00 -5 12	13.00 10 45	13.00 2 40	13.00 13 42	13.00 13 42
26.00 -16 207	12.00 -4 15	12.00 -4 15	12.00 15 50	12.00 7 33	12.00 18 45	12.00 18 45
27.00 -16 207	11.00 -2 19	11.00 -2 19	11.00 16 56	11.00 7 46	11.00 18 49	11.00 18 49
28.00 -16 207	10.00 -2 26	10.00 -2 26	10.00 23 73	10.00 12 54	10.00 21 74	10.00 21 74
29.00 -16 207	9.00 -3 31	9.00 -3 31	9.00 25 86	9.00 15 58	9.00 24 89	9.00 24 89
30.00 -16 207	8.00 -4 36	8.00 -4 36	8.00 28 104	8.00 18 63	8.00 27 96	8.00 27 96
31.00 -16 207	7.00 -5 41	7.00 -5 41	7.00 30 132	7.00 21 78	7.00 30 122	7.00 30 122
32.00 -16 207	6.00 -6 46	6.00 -6 46	6.00 32 140	6.00 23 88	6.00 32 130	6.00 32 130
33.00 -16 207	5.00 -7 51	5.00 -7 51	5.00 34 145	5.00 25 92	5.00 34 134	5.00 34 134
34.00 -16 207	4.00 -8 56	4.00 -8 56	4.00 36 150	4.00 27 96	4.00 36 138	4.00 36 138
35.00 -16 207	3.00 -10 01	3.00 -10 01	3.00 38 155	3.00 29 100	3.00 38 143	3.00 38 143
36.00 -16 207	2.00 -11 06	2.00 -11 06	2.00 40 160	2.00 31 104	2.00 40 148	2.00 40 148
37.00 -16 207	1.00 -12 11	1.00 -12 11	1.00 42 165	1.00 33 108	1.00 42 153	1.00 42 153
38.00 -16 207	0.00 -13 16	0.00 -13 16	0.00 44 170	0.00 35 112	0.00 44 158	0.00 44 158
39.00 -16 207	-1.00 -14 21	-1.00 -14 21	-1.00 46 175	-1.00 37 116	-1.00 46 163	-1.00 46 163
40.00 -16 207	-2.00 -15 26	-2.00 -15 26	-2.00 48 180	-2.00 39 120	-2.00 48 168	-2.00 48 168
41.00 -16 207	-3.00 -16 31	-3.00 -16 31	-3.00 50 185	-3.00 41 124	-3.00 50 173	-3.00 50 173
42.00 -16 207	-4.00 -17 36	-4.00 -17 36	-4.00 52 190	-4.00 43 128	-4.00 52 178	-4.00 52 178
43.00 -16 207	-5.00 -18 41	-5.00 -18 41	-5.00 54 195	-5.00 45 132	-5.00 54 183	-5.00 54 183
44.00 -16 207	-6.00 -19 46	-6.00 -19 46	-6.00 56 200	-6.00 47 136	-6.00 56 188	-6.00 56 188
45.00 -16 207	-7.00 -20 51	-7.00 -20 51	-7.00 58 205	-7.00 49 140	-7.00 58 193	-7.00 58 193
46.00 -16 207	-8.00 -21 56	-8.00 -21 56	-8.00 60 210	-8.00 51 144	-8.00 60 198	-8.00 60 198
47.00 -16 207	-9.00 -22 57	-9.00 -22 57	-9.00 62 215	-9.00 53 148	-9.00 62 203	-9.00 62 203
48.00 -16 207	-10.00 -23 58	-10.00 -23 58	-10.00 64 220	-10.00 55 152	-10.00 64 208	-10.00 64 208
49.00 -16 207	-11.00 -24 59	-11.00 -24 59	-11.00 66 225	-11.00 57 156	-11.00 66 213	-11.00 66 213
50.00 -16 207	-12.00 -25 59	-12.00 -25 59	-12.00 68 230	-12.00 59 160	-12.00 68 218	-12.00 68 218
51.00 -16 207	-13.00 -26 59	-13.00 -26 59	-13.00 70 235	-13.00 61 164	-13.00 70 223	-13.00 70 223
52.00 -16 207	-14.00 -27 59	-14.00 -27 59	-14.00 72 240	-14.00 63 168	-14.00 72 228	-14.00 72 228
53.00 -16 207	-15.00 -28 59	-15.00 -28 59	-15.00 74 245	-15.00 65 172	-15.00 74 233	-15.00 74 233
54.00 -16 207	-16.00 -29 59	-16.00 -29 59	-16.00 76 250	-16.00 67 176	-16.00 76 238	-16.00 76 238
55.00 -16 207	-17.00 -30 59	-17.00 -30 59	-17.00 78 255	-17.00 69 180	-17.00 78 243	-17.00 78 243
56.00 -16 207	-18.00 -31 59	-18.00 -31 59	-18.00 80 260	-18.00 71 184	-18.00 80 248	-18.00 80 248
57.00 -16 207	-19.00 -32 59	-19.00 -32 59	-19.00 82 265	-19.00 73 188	-19.00 82 253	-19.00 82 253
58.00 -16 207	-20.00 -33 59	-20.00 -33 59	-20.00 84 270	-20.00 75 192	-20.00 84 258	-20.00 84 258
59.00 -16 207	-21.00 -34 59	-21.00 -34 59	-21.00 86 275	-21.00 77 196	-21.00 86 263	-21.00 86 263
60.00 -16 207	-22.00 -35 59	-22.00 -35 59	-22.00 88 280	-22.00 79 200	-22.00 88 268	-22.00 88 268
61.00 -16 207	-23.00 -36 59	-23.00 -36 59	-23.00 90 285	-23.00 81 204	-23.00 90 273	-23.00 90 273
62.00 -16 207	-24.00 -37 59	-24.00 -37 59	-24.00 92 290	-24.00 83 208	-24.00 92 278	-24.00 92 278
63.00 -16 207	-25.00 -38 59	-25.00 -38 59	-25.00 94 295	-25.00 85 212	-25.00 94 283	-25.00 94 283
64.00 -16 207	-26.00 -39 59	-26.00 -39 59	-26.00 96 300	-26.00 87 216	-26.00 96 288	-26.00 96 288
65.00 -16 207	-27.00 -40 59	-27.00 -40 59	-27.00 98 305	-27.00 89 220	-27.00 98 293	-27.00 98 293
66.00 -16 207	-28.00 -41 59	-28.00 -41 59	-28.00 100 310	-28.00 91 224	-28.00 100 298	-28.00 100 298
67.00 -16 207	-29.00 -42 59	-29.00 -42 59	-29.00 102 315	-29.00 93 228	-29.00 102 303	-29.00 102 303
68.00 -16 207	-30.00 -43 59	-30.00 -43 59	-30.00 104 320	-30.00 95 232	-30.00 104 308	-30.00 104 308
69.00 -16 207	-31.00 -44 59	-31.00 -44 59	-31.00 106 325	-31.00 97 236	-31.00 106 313	-31.00 106 313
70.00 -16 207	-32.00 -45 59	-32.00 -45 59	-32.00 108 330	-32.00 99 240	-32.00 108 318	-32.00 108 318
71.00 -16 207	-33.00 -46 59	-33.00 -46 59	-33.00 110 335	-33.00 101 244	-33.00 110 323	-33.00 110 323
72.00 -16 207	-34.00 -47 59	-34.00 -47 59	-34.00 112 340	-34.00 103 248	-34.00 112 328	-34.00 112 328
73.00 -16 207	-35.00 -48 59	-35.00 -48 59	-35.00 114 345	-35.00 105 252	-35.00 114 333	-35.00 114 333
74.00 -16 207	-36.00 -49 59	-36.00 -49 59	-36.00 116 350	-36.00 107 256	-36.00 116 338	-36.00 116 338
75.00 -16 207	-37.00 -50 59	-37.00 -50 59	-37.00 118 355	-37.00 109 260	-37.00 118 343	-37.00 118 343
76.00 -16 207	-38.00 -51 59	-38.00 -51 59	-38.00 120 360	-38.00 111 264	-38.00 120 348	-38.00 120 348
77.00 -16 207	-39.00 -52 59	-39.00 -52 59	-39.00 122 365	-39.00 113 268	-39.00 122 353	-39.00 122 353
78.00 -16 207	-40.00 -53 59	-40.00 -53 59	-40.00 124 370	-40.00 115 272	-40.00 124 358	-40.00 124 358
79.00 -16 207	-41.00 -54 59	-41.00 -54 59	-41.00 126 375	-41.00 117 276	-41.00 126 363	-41.00 126 363
80.00 -16 207	-42.00 -55 59	-42.00 -55 59	-42.00 128 380	-42.00 119 280	-42.00 128 368	-42.00 128 368
81.00 -16 207	-43.00 -56 59	-43.00 -56 59	-43.00 130 385	-43.00 121 284	-43.00 130 373	-43.00 130 373
82.00 -16 207	-44.00 -57 59	-44.00 -57 59	-44.00 132 390	-44.00 123 288	-44.00 132 378	-44.00 132 378
83.00 -16 207	-45.00 -58 59	-45.00 -58 59	-45.00 134 395	-45.00 125 292	-45.00 134 383	-45.00 134 383
84.00 -16 207	-46.00 -59 59	-46.00 -59 59	-46.00 136 400	-46.00 127 296	-46.00 136 388	-46.00 136 388
85.00 -16 207	-47.00 -60 59	-47.00 -60 59	-47.00 138 405	-47.00 129 300	-47.00 138 393	-47.00 138 393
86.00 -16 207	-48.00 -61 59	-48.00 -61 59	-48.00 140 410	-48.00 131 304	-48.00 140 398	-48.00 140 398
87.00 -16 207	-49.00 -62 59	-49.00 -62 59	-49.00 142 415	-49.00 133 308	-49.00 142 403	-49.00 142 403
88.00 -16 207	-50.00 -63 59	-50.00 -63 59	-50.00 144 420	-50.00 135 312	-50.00 144 408	-50.00 144 408
89.00 -16 207	-51.00 -64 59	-51.00 -64 59	-51.00 146 425	-51.00 137 316	-51.00 146 413	-51.00 146 413
90.00 -16 207	-52.00 -65 59	-52.00 -65 59	-52.00 148 430	-52.00 139 320	-52.00 148 418	-52.00 148 418
91.00 -16 207	-53.00 -66 59	-53.00 -66 59	-53.00 150 435	-53.00 141 324	-53.00 150 423	-53.00 150 423
92.00 -16 207	-54.00 -67 59	-54.00 -67 59	-54.00 152 440	-54.00 143 328	-54.00 152 428	-54.00 152 428
93.00 -16 207	-55.00 -68 59	-55.00 -68 59	-55.00 154 445	-55.00 145 332	-55.00 154 433	-55.00 154 433
94.00 -16 207	-56.00 -69 59	-56.00 -69 59	-56.00 156 450	-56.00 147 336	-56.00 156 438	-56.00 156 438
95.00 -16 207	-57.00 -70 59	-57.00 -70 59	-57.00 158 455	-57.00 149 340	-57.00 158 443	-57.00 158 443
96.00 -16 207	-58.00 -71 59	-58.00 -71 59	-58.00 160 460	-58.00 151 344	-58.00 160 448	-58.00 160 448
97.00 -16 207	-59.00 -72 59	-59.00 -72 59	-59.00 162 465	-59.00 153 348	-59.00 162 453	-59.00 162 453
98.00 -16 207	-60.00 -73 59	-60.00 -73 59	-60.00 164 470	-60.00 155 352	-60.00 164 458	-60.00 164 458
99.00 -16 207	-61.00 -74 59	-61.00 -74 59	-61.00 166 475	-61.00 157 356	-61.00 166 463	-61.00 166 463
100.00 -16 207	-62.00 -75 59	-62.00 -75 59	-62.00 168 480	-62.00 159 360	-62.00 168 468	-62.00 168 468

TABLE 41 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 5.00 LONG. = 5.00	GEOGRAPHIC LAT. = 5.00 LONG. = 15.00	GEOGRAPHIC LAT. = 5.00 LONG. = 30.00	GEOGRAPHIC LAT. = 5.00 LONG. = 45.00	GEOGRAPHIC LAT. = 5.00 LONG. = 60.00	GEOGRAPHIC LAT. = 5.00 LONG. = 75.00
RIG AN (GV)	RIG AN (GV)	RIG AN (GV)	RIG AN (GV)	RIG AN (GV)	RIG AN (GV)
28.00	21.00	20.00	20.00	20.00	20.00
19.00	13.00	19.00	19.00	19.00	19.00
18.00	12.00	18.00	18.00	18.00	18.00
17.00	11.00	17.00	17.00	17.00	17.00
16.00	10.00	16.00	16.00	16.00	16.00
15.00	9.00	15.00	15.00	15.00	15.00
14.00	8.00	14.00	14.00	14.00	14.00
13.00	7.00	13.00	13.00	13.00	13.00
12.00	6.00	12.00	12.00	12.00	12.00
11.00	5.00	11.00	11.00	11.00	11.00
10.00	4.00	10.00	10.00	10.00	10.00
9.00	3.00	9.00	9.00	9.00	9.00
8.00	2.00	8.00	8.00	8.00	8.00
7.00	1.00	7.00	7.00	7.00	7.00
6.00	0.00	6.00	6.00	6.00	6.00
5.00	-1.00	5.00	5.00	5.00	5.00
4.00	-2.00	4.00	4.00	4.00	4.00
3.00	-3.00	3.00	3.00	3.00	3.00
2.00	-4.00	2.00	2.00	2.00	2.00
1.00	-5.00	1.00	1.00	1.00	1.00
0.00	-6.00	0.00	0.00	0.00	0.00
-1.00	-7.00	-1.00	-1.00	-1.00	-1.00
-2.00	-8.00	-2.00	-2.00	-2.00	-2.00
-3.00	-9.00	-3.00	-3.00	-3.00	-3.00
-4.00	-10.00	-4.00	-4.00	-4.00	-4.00
-5.00	-11.00	-5.00	-5.00	-5.00	-5.00
-6.00	-12.00	-6.00	-6.00	-6.00	-6.00
-7.00	-13.00	-7.00	-7.00	-7.00	-7.00
-8.00	-14.00	-8.00	-8.00	-8.00	-8.00
-9.00	-15.00	-9.00	-9.00	-9.00	-9.00
-10.00	-16.00	-10.00	-10.00	-10.00	-10.00
-11.00	-17.00	-11.00	-11.00	-11.00	-11.00
-12.00	-18.00	-12.00	-12.00	-12.00	-12.00
-13.00	-19.00	-13.00	-13.00	-13.00	-13.00
-14.00	-20.00	-14.00	-14.00	-14.00	-14.00
-15.00	-21.00	-15.00	-15.00	-15.00	-15.00
-16.00	-22.00	-16.00	-16.00	-16.00	-16.00
-17.00	-23.00	-17.00	-17.00	-17.00	-17.00
-18.00	-24.00	-18.00	-18.00	-18.00	-18.00
-19.00	-25.00	-19.00	-19.00	-19.00	-19.00
-20.00	-26.00	-20.00	-20.00	-20.00	-20.00
-21.00	-27.00	-21.00	-21.00	-21.00	-21.00
-22.00	-28.00	-22.00	-22.00	-22.00	-22.00
-23.00	-29.00	-23.00	-23.00	-23.00	-23.00
-24.00	-30.00	-24.00	-24.00	-24.00	-24.00
-25.00	-31.00	-25.00	-25.00	-25.00	-25.00
-26.00	-32.00	-26.00	-26.00	-26.00	-26.00
-27.00	-33.00	-27.00	-27.00	-27.00	-27.00
-28.00	-34.00	-28.00	-28.00	-28.00	-28.00
-29.00	-35.00	-29.00	-29.00	-29.00	-29.00
-30.00	-36.00	-30.00	-30.00	-30.00	-30.00
-31.00	-37.00	-31.00	-31.00	-31.00	-31.00
-32.00	-38.00	-32.00	-32.00	-32.00	-32.00
-33.00	-39.00	-33.00	-33.00	-33.00	-33.00
-34.00	-40.00	-34.00	-34.00	-34.00	-34.00
-35.00	-41.00	-35.00	-35.00	-35.00	-35.00
-36.00	-42.00	-36.00	-36.00	-36.00	-36.00
-37.00	-43.00	-37.00	-37.00	-37.00	-37.00
-38.00	-44.00	-38.00	-38.00	-38.00	-38.00
-39.00	-45.00	-39.00	-39.00	-39.00	-39.00
-40.00	-46.00	-40.00	-40.00	-40.00	-40.00
-41.00	-47.00	-41.00	-41.00	-41.00	-41.00
-42.00	-48.00	-42.00	-42.00	-42.00	-42.00
-43.00	-49.00	-43.00	-43.00	-43.00	-43.00
-44.00	-50.00	-44.00	-44.00	-44.00	-44.00
-45.00	-51.00	-45.00	-45.00	-45.00	-45.00
-46.00	-52.00	-46.00	-46.00	-46.00	-46.00
-47.00	-53.00	-47.00	-47.00	-47.00	-47.00
-48.00	-54.00	-48.00	-48.00	-48.00	-48.00
-49.00	-55.00	-49.00	-49.00	-49.00	-49.00
-50.00	-56.00	-50.00	-50.00	-50.00	-50.00
-51.00	-57.00	-51.00	-51.00	-51.00	-51.00
-52.00	-58.00	-52.00	-52.00	-52.00	-52.00
-53.00	-59.00	-53.00	-53.00	-53.00	-53.00
-54.00	-60.00	-54.00	-54.00	-54.00	-54.00
-55.00	-61.00	-55.00	-55.00	-55.00	-55.00
-56.00	-62.00	-56.00	-56.00	-56.00	-56.00
-57.00	-63.00	-57.00	-57.00	-57.00	-57.00
-58.00	-64.00	-58.00	-58.00	-58.00	-58.00
-59.00	-65.00	-59.00	-59.00	-59.00	-59.00
-60.00	-66.00	-60.00	-60.00	-60.00	-60.00
-61.00	-67.00	-61.00	-61.00	-61.00	-61.00
-62.00	-68.00	-62.00	-62.00	-62.00	-62.00
-63.00	-69.00	-63.00	-63.00	-63.00	-63.00
-64.00	-70.00	-64.00	-64.00	-64.00	-64.00
-65.00	-71.00	-65.00	-65.00	-65.00	-65.00
-66.00	-72.00	-66.00	-66.00	-66.00	-66.00
-67.00	-73.00	-67.00	-67.00	-67.00	-67.00
-68.00	-74.00	-68.00	-68.00	-68.00	-68.00
-69.00	-75.00	-69.00	-69.00	-69.00	-69.00
-70.00	-76.00	-70.00	-70.00	-70.00	-70.00
-71.00	-77.00	-71.00	-71.00	-71.00	-71.00
-72.00	-78.00	-72.00	-72.00	-72.00	-72.00
-73.00	-79.00	-73.00	-73.00	-73.00	-73.00
-74.00	-80.00	-74.00	-74.00	-74.00	-74.00
-75.00	-81.00	-75.00	-75.00	-75.00	-75.00
-76.00	-82.00	-76.00	-76.00	-76.00	-76.00
-77.00	-83.00	-77.00	-77.00	-77.00	-77.00
-78.00	-84.00	-78.00	-78.00	-78.00	-78.00
-79.00	-85.00	-79.00	-79.00	-79.00	-79.00
-80.00	-86.00	-80.00	-80.00	-80.00	-80.00
-81.00	-87.00	-81.00	-81.00	-81.00	-81.00
-82.00	-88.00	-82.00	-82.00	-82.00	-82.00
-83.00	-89.00	-83.00	-83.00	-83.00	-83.00
-84.00	-90.00	-84.00	-84.00	-84.00	-84.00
-85.00	-91.00	-85.00	-85.00	-85.00	-85.00
-86.00	-92.00	-86.00	-86.00	-86.00	-86.00
-87.00	-93.00	-87.00	-87.00	-87.00	-87.00
-88.00	-94.00	-88.00	-88.00	-88.00	-88.00
-89.00	-95.00	-89.00	-89.00	-89.00	-89.00
-90.00	-96.00	-90.00	-90.00	-90.00	-90.00
-91.00	-97.00	-91.00	-91.00	-91.00	-91.00
-92.00	-98.00	-92.00	-92.00	-92.00	-92.00
-93.00	-99.00	-93.00	-93.00	-93.00	-93.00
-94.00	-100.00	-94.00	-94.00	-94.00	-94.00
-95.00	-101.00	-95.00	-95.00	-95.00	-95.00
-96.00	-102.00	-96.00	-96.00	-96.00	-96.00
-97.00	-103.00	-97.00	-97.00	-97.00	-97.00
-98.00	-104.00	-98.00	-98.00	-98.00	-98.00
-99.00	-105.00	-99.00	-99.00	-99.00	-99.00
-100.00	-106.00	-100.00	-100.00	-100.00	-100.00

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC (GV) LAT. = 5.00 LONG. = 100.00	GEOGRAPHIC (GV) LAT. = 5.00 LONG. = 210.00	GEOGRAPHIC (GV) LAT. = 5.00 LONG. = 225.00	GEOGRAPHIC (GV) LAT. = 5.00 LONG. = 240.00	GEOGRAPHIC (GV) LAT. = 5.00 LONG. = 255.00
20.00 -12 292	20.00 -16 -45	20.00 -17 -34	20.00 -17 -22	20.00 -15 -11
19.00 -12 303	19.00 -15 -36	19.00 -16 -25	19.00 -17 -14	19.00 -16 -4
18.00 -11 318	18.00 -14 -24	18.00 -15 -13	18.00 -15 -4	18.00 -15 5
17.00 -8 340	17.00 -11 -7	17.00 -12 1	17.00 -12 9	17.00 -12 16
16.00 -8 343	16.00 -9 -12	16.00 -9 22	16.00 -6 26	16.00 -7 31
15.00 -8 346	15.00 -8 -18	15.00 -8 25	15.00 -5 28	15.00 -3 50
14.00 -7 346	14.00 -7 -24	14.00 -7 29	14.00 -4 30	14.00 -3 53
13.00 -7 349	13.00 -6 -30	13.00 -6 34	13.00 -3 33	13.00 -2 33
12.00 -6 353	12.00 -5 -36	12.00 -5 38	12.00 -2 34	12.00 -1 35
11.00 -5 357	11.00 -4 -41	11.00 -4 41	11.00 -1 36	11.00 0 36
10.00 -4 361	10.00 -3 -46	10.00 -3 46	10.00 0 37	10.00 0 38
9.00 -3 366	9.00 -2 -51	9.00 -2 51	9.00 0 38	9.00 0 39
8.00 -2 372	8.00 -1 -56	8.00 -1 56	8.00 0 39	8.00 0 40
7.00 -1 378	7.00 0 -61	7.00 0 61	7.00 0 40	7.00 0 41
6.00 0 384	6.00 1 -66	6.00 1 66	6.00 0 41	6.00 0 42
5.00 3 390	5.00 2 -71	5.00 2 71	5.00 0 42	5.00 0 43
4.00 6 405	4.00 1 -76	4.00 1 76	4.00 0 43	4.00 0 44
3.00 9 420	3.00 0 -81	3.00 0 81	3.00 0 44	3.00 0 45
2.00 13 446	2.00 0 -86	2.00 0 86	2.00 0 45	2.00 0 46
1.00 14 450	1.00 0 -91	1.00 0 91	1.00 0 46	1.00 0 47
0.00 14 454	0.00 0 -96	0.00 0 96	0.00 0 47	0.00 0 48
-1.00 14 458	-1.00 0 -101	-1.00 0 101	-1.00 0 48	-1.00 0 49
-2.00 14 462	-2.00 0 -106	-2.00 0 106	-2.00 0 49	-2.00 0 50
-3.00 14 466	-3.00 0 -111	-3.00 0 111	-3.00 0 50	-3.00 0 51
-4.00 14 470	-4.00 0 -116	-4.00 0 116	-4.00 0 51	-4.00 0 52
-5.00 14 474	-5.00 0 -121	-5.00 0 121	-5.00 0 52	-5.00 0 53
-6.00 14 478	-6.00 0 -126	-6.00 0 126	-6.00 0 53	-6.00 0 54
-7.00 14 482	-7.00 0 -131	-7.00 0 131	-7.00 0 54	-7.00 0 55
-8.00 14 486	-8.00 0 -136	-8.00 0 136	-8.00 0 55	-8.00 0 56
-9.00 14 490	-9.00 0 -141	-9.00 0 141	-9.00 0 56	-9.00 0 57
-10.00 14 494	-10.00 0 -146	-10.00 0 146	-10.00 0 57	-10.00 0 58
-11.00 14 498	-11.00 0 -151	-11.00 0 151	-11.00 0 58	-11.00 0 59
-12.00 14 502	-12.00 0 -156	-12.00 0 156	-12.00 0 59	-12.00 0 60
-13.00 14 506	-13.00 0 -161	-13.00 0 161	-13.00 0 60	-13.00 0 61
-14.00 14 510	-14.00 0 -166	-14.00 0 166	-14.00 0 61	-14.00 0 62
-15.00 14 514	-15.00 0 -171	-15.00 0 171	-15.00 0 62	-15.00 0 63
-16.00 14 518	-16.00 0 -176	-16.00 0 176	-16.00 0 63	-16.00 0 64
-17.00 14 522	-17.00 0 -181	-17.00 0 181	-17.00 0 64	-17.00 0 65
-18.00 14 526	-18.00 0 -186	-18.00 0 186	-18.00 0 65	-18.00 0 66
-19.00 14 530	-19.00 0 -191	-19.00 0 191	-19.00 0 66	-19.00 0 67
-20.00 14 534	-20.00 0 -196	-20.00 0 196	-20.00 0 67	-20.00 0 68
-21.00 14 538	-21.00 0 -201	-21.00 0 201	-21.00 0 68	-21.00 0 69
-22.00 14 542	-22.00 0 -206	-22.00 0 206	-22.00 0 69	-22.00 0 70
-23.00 14 546	-23.00 0 -211	-23.00 0 211	-23.00 0 70	-23.00 0 71
-24.00 14 550	-24.00 0 -216	-24.00 0 216	-24.00 0 71	-24.00 0 72
-25.00 14 554	-25.00 0 -221	-25.00 0 221	-25.00 0 72	-25.00 0 73
-26.00 14 558	-26.00 0 -226	-26.00 0 226	-26.00 0 73	-26.00 0 74
-27.00 14 562	-27.00 0 -231	-27.00 0 231	-27.00 0 74	-27.00 0 75
-28.00 14 566	-28.00 0 -236	-28.00 0 236	-28.00 0 75	-28.00 0 76
-29.00 14 570	-29.00 0 -241	-29.00 0 241	-29.00 0 76	-29.00 0 77
-30.00 14 574	-30.00 0 -246	-30.00 0 246	-30.00 0 77	-30.00 0 78
-31.00 14 578	-31.00 0 -251	-31.00 0 251	-31.00 0 78	-31.00 0 79
-32.00 14 582	-32.00 0 -256	-32.00 0 256	-32.00 0 79	-32.00 0 80
-33.00 14 586	-33.00 0 -261	-33.00 0 261	-33.00 0 80	-33.00 0 81
-34.00 14 590	-34.00 0 -266	-34.00 0 266	-34.00 0 81	-34.00 0 82
-35.00 14 594	-35.00 0 -271	-35.00 0 271	-35.00 0 82	-35.00 0 83
-36.00 14 598	-36.00 0 -276	-36.00 0 276	-36.00 0 83	-36.00 0 84
-37.00 14 602	-37.00 0 -281	-37.00 0 281	-37.00 0 84	-37.00 0 85
-38.00 14 606	-38.00 0 -286	-38.00 0 286	-38.00 0 85	-38.00 0 86
-39.00 14 610	-39.00 0 -291	-39.00 0 291	-39.00 0 86	-39.00 0 87
-40.00 14 614	-40.00 0 -296	-40.00 0 296	-40.00 0 87	-40.00 0 88
-41.00 14 618	-41.00 0 -301	-41.00 0 301	-41.00 0 88	-41.00 0 89
-42.00 14 622	-42.00 0 -306	-42.00 0 306	-42.00 0 89	-42.00 0 90
-43.00 14 626	-43.00 0 -311	-43.00 0 311	-43.00 0 90	-43.00 0 91
-44.00 14 630	-44.00 0 -316	-44.00 0 316	-44.00 0 91	-44.00 0 92
-45.00 14 634	-45.00 0 -321	-45.00 0 321	-45.00 0 92	-45.00 0 93
-46.00 14 638	-46.00 0 -326	-46.00 0 326	-46.00 0 93	-46.00 0 94
-47.00 14 642	-47.00 0 -331	-47.00 0 331	-47.00 0 94	-47.00 0 95
-48.00 14 646	-48.00 0 -336	-48.00 0 336	-48.00 0 95	-48.00 0 96
-49.00 14 650	-49.00 0 -341	-49.00 0 341	-49.00 0 96	-49.00 0 97
-50.00 14 654	-50.00 0 -346	-50.00 0 346	-50.00 0 97	-50.00 0 98
-51.00 14 658	-51.00 0 -351	-51.00 0 351	-51.00 0 98	-51.00 0 99
-52.00 14 662	-52.00 0 -356	-52.00 0 356	-52.00 0 99	-52.00 0 100
-53.00 14 666	-53.00 0 -361	-53.00 0 361	-53.00 0 100	-53.00 0 101
-54.00 14 670	-54.00 0 -366	-54.00 0 366	-54.00 0 101	-54.00 0 102
-55.00 14 674	-55.00 0 -371	-55.00 0 371	-55.00 0 102	-55.00 0 103
-56.00 14 678	-56.00 0 -376	-56.00 0 376	-56.00 0 103	-56.00 0 104
-57.00 14 682	-57.00 0 -381	-57.00 0 381	-57.00 0 104	-57.00 0 105
-58.00 14 686	-58.00 0 -386	-58.00 0 386	-58.00 0 105	-58.00 0 106
-59.00 14 690	-59.00 0 -391	-59.00 0 391	-59.00 0 106	-59.00 0 107
-60.00 14 694	-60.00 0 -396	-60.00 0 396	-60.00 0 107	-60.00 0 108
-61.00 14 698	-61.00 0 -401	-61.00 0 401	-61.00 0 108	-61.00 0 109
-62.00 14 702	-62.00 0 -406	-62.00 0 406	-62.00 0 109	-62.00 0 110
-63.00 14 706	-63.00 0 -411	-63.00 0 411	-63.00 0 110	-63.00 0 111
-64.00 14 710	-64.00 0 -416	-64.00 0 416	-64.00 0 111	-64.00 0 112
-65.00 14 714	-65.00 0 -421	-65.00 0 421	-65.00 0 112	-65.00 0 113
-66.00 14 718	-66.00 0 -426	-66.00 0 426	-66.00 0 113	-66.00 0 114
-67.00 14 722	-67.00 0 -431	-67.00 0 431	-67.00 0 114	-67.00 0 115
-68.00 14 726	-68.00 0 -436	-68.00 0 436	-68.00 0 115	-68.00 0 116
-69.00 14 730	-69.00 0 -441	-69.00 0 441	-69.00 0 116	-69.00 0 117
-70.00 14 734	-70.00 0 -446	-70.00 0 446	-70.00 0 117	-70.00 0 118
-71.00 14 738	-71.00 0 -451	-71.00 0 451	-71.00 0 118	-71.00 0 119
-72.00 14 742	-72.00 0 -456	-72.00 0 456	-72.00 0 119	-72.00 0 120
-73.00 14 746	-73.00 0 -461	-73.00 0 461	-73.00 0 120	-73.00 0 121
-74.00 14 750	-74.00 0 -466	-74.00 0 466	-74.00 0 121	-74.00 0 122
-75.00 14 754	-75.00 0 -471	-75.00 0 471	-75.00 0 122	-75.00 0 123
-76.00 14 758	-76.00 0 -476	-76.00 0 476	-76.00 0 123	-76.00 0 124
-77.00 14 762	-77.00 0 -481	-77.00 0 481	-77.00 0 124	-77.00 0 125
-78.00 14 766	-78.00 0 -486	-78.00 0 486	-78.00 0 125	-78.00 0 126
-79.00 14 770	-79.00 0 -491	-79.00 0 491	-79.00 0 126	-79.00 0 127
-80.00 14 774	-80.00 0 -496	-80.00 0 496	-80.00 0 127	-80.00 0 128
-81.00 14 778	-81.00 0 -501	-81.00 0 501	-81.00 0 128	-81.00 0 129
-82.00 14 782	-82.00 0 -506	-82.00 0 506	-82.00 0 129	-82.00 0 130
-83.00 14 786	-83.00 0 -511	-83.00 0 511	-83.00 0 130	-83.00 0 131
-84.00 14 790	-84.00 0 -516	-84.00 0 516	-84.00 0 131	-84.00 0 132
-85.00 14 794	-85.00 0 -521	-85.00 0 521	-85.00 0 132	-85.00 0 133
-86.00 14 798	-86.00 0 -526	-86.00 0 526	-86.00 0 133	-86.00 0 134
-87.00 14 802	-87.00 0 -531	-87.00 0 531	-87.00 0 134	-87.00 0 135
-88.00 14 806	-88.00 0 -536	-88.00 0 536	-88.00 0 135	-88.00 0 136
-89.00 14 810	-89.00 0 -541	-89.00 0 541	-89.00 0 136	-89.00 0 137
-90.00 14 814	-90.00 0 -546	-90.00 0 546	-90.00 0 137	-90.00 0 138
-91.00 14 818	-91.00 0 -551	-91.00 0 551	-91.00 0 138	-91.00 0 139
-92.00 14 822	-92.00 0 -556	-92.00 0 556	-92.00 0 139	-92.00 0 140
-93.00 14 826	-93.00 0 -561	-93.00 0 561	-93.00 0 140	-93.00 0 141
-94.00 14 830	-94.00 0 -566	-94.00 0 566	-94.00 0 141	-94.00 0 142
-95.00 14 834	-95.00 0 -571	-95.00 0 571	-95.00 0 142	-95.00 0 143
-96.00 14 838	-96.00 0 -576	-96.00 0 576	-96.00 0 143	-96.00 0 144
-97.00 14 842	-97.00 0 -581	-97.00 0 581	-97.00 0 144	-97.00 0 145
-98.00 14 846	-98.00 0 -586	-98.00 0 586	-98.00 0 145	-98.00 0 146
-99.00 14 850	-99.00 0 -591	-99.00 0 591	-99.00 0 146	-99.00 0 147
-100.00 14 854	-100.00 0 -596	-100.00 0 596	-100.00 0 147	-100.00 0 148

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC (GV) LAT LONG			GEOGRAPHIC LAT. = 0.00 LONG. = 0.00			GEOGRAPHIC LAT. = 0.00 LONG. = 30.00			GEOGRAPHIC LAT. = 0.00 LONG. = 45.00			GEOGRAPHIC LAT. = 60.00 LONG. = 60.00			GEOGRAPHIC (GV) LAT LONG		
ASYMPTOTIC			ASYMPTOTIC			ASYMPTOTIC			ASYMPTOTIC			ASYMPTOTIC			ASYMPTOTIC		
RIG			RIG			RIG			RIG			RIG			RIG		
28.00	12	92	21.00	12	111	20.00	11	132	20.00	11	154	20.00	10	177	20.00	7	200
19.00	11	100	13.00	11	120	13.00	11	141	13.00	10	165	13.00	7	198	13.00	3	215
18.00	10	109	13.00	10	130	18.00	9	153	18.00	7	179	18.00	3	208	18.00	-4	237
17.00	9	121	17.00	9	144	17.00	7	170	17.00	2	200	17.00	2	210	17.00	-5	249
16.00	6	130	15.00	6	164	16.00	0	196	16.00	2	202	16.00	1	212	16.00	-6	244
15.00	0	166	15.00	4	167	15.00	-1	200	15.00	1	205	15.00	1	215	15.00	-7	247
14.00	-1	170	14.00	3	170	14.00	-2	204	14.00	0	209	14.00	0	217	14.00	-9	251
13.00	-1	175	13.00	2	173	13.00	-3	204	13.00	-1	212	13.00	-1	220	13.00	-10	256
12.00	-2	180	12.00	2	176	12.00	-4	214	12.00	-2	216	12.00	-3	223	12.00	-11	261
11.00	-3	186	11.00	1	179	11.00	-5	220	11.00	-3	225	11.00	-4	230	11.00	-13	266
10.00	-3	193	10.00	0	183	10.00	-7	227	10.00	-5	230	10.00	-6	234	10.00	-14	273
9.00	-4	201	9.00	-1	187	9.00	-8	236	9.00	-7	236	9.00	-8	243	9.00	-16	281
8.00	-4	211	8.00	-2	192	8.00	-10	242	8.00	-9	243	8.00	-10	248	8.00	-17	291
7.00	-4	225	7.00	-3	197	7.00	-12	250	7.00	-10	251	7.00	-11	255	7.00	-18	303
6.00	-4	245	6.00	-4	203	6.00	-14	259	6.00	-12	262	6.00	-13	262	6.00	-19	312
5.00	-5	252	5.00	-5	210	5.00	-16	269	5.00	-14	271	5.00	-15	268	5.00	-20	322
4.00	-5	292	4.00	-6	219	4.00	-18	293	4.00	-16	299	4.00	-17	298	4.00	-21	332
3.00	-5	301	3.00	-7	230	3.00	-20	301	3.00	-18	306	3.00	-19	306	3.00	-22	341
2.00	-7	312	2.00	-7	244	2.00	-22	306	2.00	-20	311	2.00	-21	311	2.00	-23	352
1.00	-7	328	1.00	-7	267	1.00	-24	306	1.00	-22	309	1.00	-23	309	1.00	-24	362
0.00	-9	328	0.00	-7	270	0.00	-26	311	0.00	-24	311	0.00	-25	311	0.00	-25	368
-1.00	-11	356	-1.00	-7	273	-1.00	-28	317	-1.00	-26	315	-1.00	-27	315	-1.00	-26	373
13.04	19	457	14.47	-7	277	14.92	-7	325	15.55	-10	318	16.19	-9	336	16.63	12	411
13.03	R	R	14.46	-7	261	14.91	-6	314	15.54	-10	322	16.17	-8	341	16.62	15	440
			14.45	-7	265	14.91	-5	315	15.54	-10	328	16.16	-6	346	16.61	R	R
			14.44	-6	280	14.89	-4	345	15.53	-9	328	16.15	-5	353			
			14.43	-5	296	14.88	-3	361	15.52	-8	334	16.14	-4	360			
			14.42	-6	302	14.87	0	388	15.51	-6	341	16.13	-3	369			
			14.41	-6	310	14.86	12	499	15.50	-5	350	16.12	-2	382			
			14.40	-7	319	14.85	R	R	15.49	-4	361	16.11	-1	399			
			14.39	-7	331	14.84	14.86	14.86	15.48	-3	377	16.10	12	433			
			14.38	-7	349	14.83	14.85	14.85	15.47	-2	403	16.09	R	R			
			14.37	-5	360	14.82	14.84	14.84	15.46	-1	502						
			14.36	9	R	14.81	14.83	14.83	15.45	0	R						

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 0.00 LONG. = 90.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 0.00 LONG. = 105.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 0.00 LONG. = 120.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 0.00 LONG. = 135.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 0.00 LONG. = 150.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = 0.00 LONG. = 165.00	RIG ASYMPTOTIC (GV) LAT LONG
20.00	5 221	21.00	3 217	20.00	1 269	20.00	-1 260	20.00	-3 270	20.00	-5 282
19.00	0 217	19.00	-2 253	19.00	-3 285	19.00	-5 273	19.00	-7 283	19.00	-9 294
18.00	-8 263	18.00	-11 261	18.00	-10 289	18.00	-8 296	18.00	-7 300	18.00	-5 298
17.00	-10 267	17.00	-12 285	17.00	-11 292	17.00	-9 296	17.00	-7 303	17.00	-5 307
16.00	-12 271	16.00	-13 289	16.00	-12 296	16.00	-9 299	16.00	-8 305	16.00	-6 311
15.00	-13 276	15.00	-14 295	15.00	-13 300	15.00	-10 302	15.00	-8 308	15.00	-6 315
14.00	-14 282	14.00	-15 301	14.00	-14 305	14.00	-11 306	14.00	-9 310	14.00	-7 319
13.00	-16 289	13.00	-17 308	13.00	-15 310	13.00	-12 309	13.00	-9 313	13.00	-7 324
12.00	-17 296	12.00	-18 316	12.00	-16 316	12.00	-13 314	12.00	-9 316	12.00	-7 328
11.00	-18 306	11.00	-19 327	11.00	-17 323	11.00	-14 318	11.00	-10 320	11.00	-8 333
10.00	-19 319	10.00	-20 340	10.00	-18 332	10.00	-15 323	10.00	-11 323	10.00	-9 338
9.00	-20 336	9.00	-21 360	9.00	-19 342	9.00	-16 329	9.00	-12 327	9.00	-10 344
8.00	-21 363	8.00	-22 393	8.00	-20 355	8.00	-17 335	8.00	-13 332	8.00	-11 350
7.00	-22 371	7.00	-23 405	7.00	-21 373	7.00	-18 343	7.00	-14 336	7.00	-12 356
6.00	-23 375	6.00	-24 414	6.00	-22 384	6.00	-19 352	6.00	-15 342	6.00	-13 362
5.00	-24 381	5.00	-25 426	5.00	-23 399	5.00	-20 364	5.00	-16 346	5.00	-14 366
4.00	-25 387	4.00	-26 433	4.00	-24 409	4.00	-21 379	4.00	-17 350	4.00	-15 371
3.00	-26 395	3.00	-27 443	3.00	-25 423	3.00	-22 391	3.00	-18 354	3.00	-16 376
2.00	-27 405	2.00	-28 453	2.00	-26 433	2.00	-23 404	2.00	-19 358	2.00	-17 381
1.00	-28 419	1.00	-29 464	1.00	-27 446	1.00	-24 415	1.00	-20 362	1.00	-18 386
0.00	-29 442	0.00	-30 473	0.00	-28 457	0.00	-25 427	0.00	-21 366	0.00	-19 391
-1.00	-30 462	-1.00	-31 482	-1.00	-29 468	-1.00	-26 438	-1.00	-22 371	-1.00	-20 396
-2.00	-31 495	-2.00	-32 495	-2.00	-30 482	-2.00	-27 451	-2.00	-23 376	-2.00	-21 401
-3.00	-32 519	-3.00	-33 502	-3.00	-31 495	-3.00	-28 464	-3.00	-24 381	-3.00	-22 406
-4.00	-33 544	-4.00	-34 511	-4.00	-32 508	-4.00	-29 477	-4.00	-25 386	-4.00	-23 411
-5.00	-34 569	-5.00	-35 521	-5.00	-33 522	-5.00	-30 490	-5.00	-26 391	-5.00	-24 416
-6.00	-35 594	-6.00	-36 531	-6.00	-34 536	-6.00	-31 503	-6.00	-27 396	-6.00	-25 421
-7.00	-36 619	-7.00	-37 541	-7.00	-35 550	-7.00	-32 516	-7.00	-28 401	-7.00	-26 426
-8.00	-37 644	-8.00	-38 551	-8.00	-36 564	-8.00	-33 529	-8.00	-29 406	-8.00	-27 431
-9.00	-38 669	-9.00	-39 561	-9.00	-37 578	-9.00	-34 542	-9.00	-30 411	-9.00	-28 436
-10.00	-39 694	-10.00	-40 571	-10.00	-38 592	-10.00	-35 556	-10.00	-31 416	-10.00	-29 441
-11.00	-40 719	-11.00	-41 581	-11.00	-39 606	-11.00	-36 569	-11.00	-32 421	-11.00	-30 446
-12.00	-41 744	-12.00	-42 591	-12.00	-40 620	-12.00	-37 583	-12.00	-33 426	-12.00	-31 451
-13.00	-42 769	-13.00	-43 601	-13.00	-41 634	-13.00	-38 596	-13.00	-34 431	-13.00	-32 456
-14.00	-43 794	-14.00	-44 611	-14.00	-42 648	-14.00	-39 610	-14.00	-35 436	-14.00	-33 461
-15.00	-44 819	-15.00	-45 621	-15.00	-43 662	-15.00	-40 624	-15.00	-36 441	-15.00	-34 466
-16.00	-45 844	-16.00	-46 631	-16.00	-44 676	-16.00	-41 638	-16.00	-37 446	-16.00	-35 471
-17.00	-46 869	-17.00	-47 641	-17.00	-45 690	-17.00	-42 652	-17.00	-38 451	-17.00	-36 476
-18.00	-47 894	-18.00	-48 651	-18.00	-46 704	-18.00	-43 666	-18.00	-39 456	-18.00	-37 481
-19.00	-48 919	-19.00	-49 661	-19.00	-47 718	-19.00	-44 680	-19.00	-40 461	-19.00	-38 486
-20.00	-49 944	-20.00	-50 671	-20.00	-48 732	-20.00	-45 694	-20.00	-41 466	-20.00	-39 491

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 0.00 LONG. = 100.00	GEOGRAPHIC LAT. = 0.00 LONG. = 195.00	GEOGRAPHIC LAT. = 0.00 LONG. = 210.00	GEOGRAPHIC LAT. = 0.00 LONG. = 225.00	GEOGRAPHIC LAT. = 0.00 LONG. = 240.00	GEOGRAPHIC LAT. = 0.00 LONG. = 255.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 -8 296	21.00 -10 -54	20.00 -12 -42	20.00 -13 -30	20.00 -13 -19	20.00 -12 -8
19.00 -6 385	19.00 -11 -44	19.00 -11 -32	19.00 -12 -21	19.00 -12 -10	19.00 -12 0
18.00 -7 321	18.00 -9 -30	18.00 -10 -20	18.00 -10 -9	18.00 -10 0	18.00 -10 10
17.00 -6 344	17.00 -6 -9	17.00 -6 -2	17.00 -7 6	17.00 -7 14	17.00 -7 21
16.00 -6 347	16.00 -6 -7	16.00 -6 0	16.00 1 30	16.00 0 33	16.00 -1 37
16.00 -6 351	15.00 -5 -4	15.00 -5 3	15.00 2 35	15.00 1 38	15.00 10 41
16.00 -6 354	15.00 -5 -1	15.00 -5 5	15.00 3 37	15.00 2 39	15.00 12 47
16.00 -5 358	15.00 -4 -2	15.00 -4 8	15.00 5 41	15.00 3 41	15.00 13 51
16.00 -5 363	15.00 -4 6	15.00 -4 11	15.00 6 -5	15.00 4 44	15.00 15 75
16.00 -5 360	15.00 -4 10	15.00 -4 14	15.00 8 50	15.00 6 48	15.00 17 61
16.00 -4 373	15.00 -2 14	15.00 -2 17	15.00 10 55	15.00 7 51	15.00 18 47
16.00 -4 380	15.00 -2 18	15.00 -2 20	15.00 12 62	15.00 9 55	15.00 20 95
16.00 -2 387	15.00 -1 21	15.00 -1 24	15.00 14 59	15.00 11 60	15.00 21 104
16.00 -2 396	15.00 -1 29	15.00 -1 26	15.00 16 79	15.00 13 65	15.00 21 115
15.00 2 407	15.00 2 36	15.00 2 32	15.00 17 92	15.00 14 70	15.00 18 130
15.00 6 423	15.00 4 43	15.00 4 37	15.00 17 109	15.00 16 77	15.00 9 151
15.00 12 444	15.00 6 53	15.00 6 43	15.00 18 130	15.00 18 86	15.00 8 154
15.00 14 456	15.00 8 65	15.00 8 57	15.00 19 143	15.00 20 96	15.00 6 157
15.00 14 461	15.00 11 77	15.00 11 67	15.00 20 110	15.00 21 110	15.00 4 160
15.00 15 466	15.00 14 127	15.00 14 80	15.00 21 160	15.00 22 129	15.00 2 163
15.00 15 472	15.00 13 129	15.00 13 99	15.00 21 166	15.00 23 162	15.00 0 167
15.00 16 479	15.00 12 136	15.00 12 135	15.00 21 177	15.00 24 173	15.00 -2 176
15.00 15 480	15.00 10 145	15.00 9 141	15.00 21 190	15.00 25 191	15.00 -7 181
15.00 15 498	15.00 7 156	15.00 6 147	15.00 21 211	15.00 26 205	15.00 -12 198
15.00 15 512	15.00 2 171	15.00 1 155	15.00 21 226	15.00 27 226	15.00 -14 206
15.00 15 532	15.00 -5 195	15.00 -3 178	15.00 21 243	15.00 28 243	15.00 -16 221
15.00 15 575	15.00 -5 281	15.00 -3 199	15.00 21 260	15.00 29 260	15.00 -18 243
15.00 15 580	15.00 3 291	15.00 3 291	15.00 21 283	15.00 30 283	15.00 -20 291
15.00 15 585	15.00 3 291	15.00 3 291	15.00 21 283	15.00 30 283	15.00 -20 291

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -5.00 LONG. = 0.00	GEOGRAPHIC LAT. = -5.00 LONG. = 15.00	GEOGRAPHIC LAT. = -5.00 LONG. = 30.00	GEOGRAPHIC LAT. = -5.00 LONG. = 45.00	GEOGRAPHIC LAT. = -5.00 LONG. = 60.00	GEOGRAPHIC LAT. = -5.00 LONG. = 75.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 15 84	21.00 15 102	22.00 15 121	23.00 15 142	24.00 15 165	25.00 14 187
19.00 15 91	20.00 15 109	21.00 15 129	22.00 15 151	23.00 14 175	24.00 14 199
18.00 15 99	19.00 15 118	20.00 15 139	21.00 14 162	22.00 14 186	23.00 14 213
17.00 15 109	18.00 15 128	19.00 15 151	20.00 14 177	21.00 14 203	22.00 14 235
16.00 15 122	17.00 15 138	18.00 15 164	19.00 14 190	20.00 14 220	21.00 14 258
15.00 15 140	16.00 15 164	17.00 15 194	18.00 14 201	19.00 14 231	20.00 14 262
14.00 15 158	15.00 15 184	16.00 15 219	17.00 14 214	18.00 14 245	19.00 14 275
13.00 15 176	14.00 15 204	15.00 15 244	16.00 14 228	17.00 14 273	18.00 14 303
12.00 15 194	13.00 15 224	14.00 15 274	15.00 14 252	16.00 14 298	17.00 14 328
11.00 15 212	12.00 15 244	13.00 15 304	14.00 14 276	15.00 14 323	16.00 14 353
10.00 15 230	11.00 15 264	12.00 15 334	13.00 14 300	14.00 14 348	15.00 14 378
9.00 15 248	10.00 15 284	11.00 15 364	12.00 14 324	13.00 14 373	14.00 14 403
8.00 15 266	9.00 15 304	10.00 15 394	11.00 14 348	12.00 14 398	13.00 14 428
7.00 15 284	8.00 15 324	9.00 15 424	10.00 14 373	11.00 14 423	12.00 14 453
6.00 15 302	7.00 15 344	8.00 15 454	9.00 14 398	10.00 14 448	11.00 14 478
5.00 15 320	6.00 15 364	7.00 15 484	8.00 14 423	9.00 14 473	10.00 14 503
4.00 15 338	5.00 15 384	6.00 15 514	7.00 14 448	8.00 14 498	9.00 14 528
3.00 15 356	4.00 15 404	5.00 15 544	6.00 14 473	7.00 14 523	8.00 14 553
2.00 15 374	3.00 15 424	4.00 15 574	5.00 14 498	6.00 14 548	7.00 14 578
1.00 15 392	2.00 15 444	3.00 15 604	4.00 14 523	5.00 14 573	6.00 14 603
0.00 15 410	1.00 15 464	2.00 15 634	3.00 14 548	4.00 14 598	5.00 14 628
20.00 14 167	21.00 14 187	22.00 14 207	23.00 14 227	24.00 14 247	25.00 14 267
19.00 14 175	20.00 14 195	21.00 14 215	22.00 14 235	23.00 14 255	24.00 14 275
18.00 14 183	19.00 14 203	20.00 14 223	21.00 14 243	22.00 14 263	23.00 14 283
17.00 14 191	18.00 14 211	19.00 14 231	20.00 14 251	21.00 14 271	22.00 14 291
16.00 14 200	17.00 14 220	18.00 14 240	19.00 14 260	20.00 14 280	21.00 14 300
15.00 14 208	16.00 14 228	17.00 14 248	18.00 14 268	19.00 14 288	20.00 14 308
14.00 14 217	15.00 14 237	16.00 14 257	17.00 14 277	18.00 14 297	19.00 14 317
13.00 14 225	14.00 14 245	15.00 14 265	16.00 14 285	17.00 14 305	18.00 14 325
12.00 14 234	13.00 14 254	14.00 14 274	15.00 14 294	16.00 14 314	17.00 14 334
11.00 14 242	12.00 14 262	13.00 14 282	14.00 14 302	15.00 14 322	16.00 14 342
10.00 14 251	11.00 14 271	12.00 14 291	13.00 14 311	14.00 14 331	15.00 14 351
9.00 14 259	10.00 14 279	11.00 14 299	12.00 14 319	13.00 14 339	14.00 14 359
8.00 14 268	9.00 14 288	10.00 14 308	11.00 14 328	12.00 14 348	13.00 14 368
7.00 14 276	8.00 14 296	9.00 14 316	10.00 14 336	11.00 14 356	12.00 14 376
6.00 14 285	7.00 14 305	8.00 14 325	9.00 14 345	10.00 14 365	11.00 14 385
5.00 14 293	6.00 14 313	7.00 14 333	8.00 14 353	9.00 14 373	10.00 14 393
4.00 14 302	5.00 14 322	6.00 14 342	7.00 14 362	8.00 14 382	9.00 14 402
3.00 14 310	4.00 14 330	5.00 14 350	6.00 14 370	7.00 14 390	8.00 14 410
2.00 14 319	3.00 14 339	4.00 14 359	5.00 14 379	6.00 14 399	7.00 14 419
1.00 14 327	2.00 14 347	3.00 14 367	4.00 14 387	5.00 14 407	6.00 14 427
0.00 14 336	1.00 14 356	2.00 14 376	3.00 14 396	4.00 14 416	5.00 14 436
20.00 13 165	21.00 13 185	22.00 13 205	23.00 13 225	24.00 13 245	25.00 13 265
19.00 13 173	20.00 13 193	21.00 13 213	22.00 13 233	23.00 13 253	24.00 13 273
18.00 13 181	19.00 13 201	20.00 13 221	21.00 13 241	22.00 13 261	23.00 13 281
17.00 13 189	18.00 13 209	19.00 13 229	20.00 13 249	21.00 13 269	22.00 13 289
16.00 13 198	17.00 13 218	18.00 13 238	19.00 13 258	20.00 13 278	21.00 13 298
15.00 13 206	16.00 13 226	17.00 13 246	18.00 13 266	19.00 13 286	20.00 13 306
14.00 13 215	15.00 13 235	16.00 13 255	17.00 13 275	18.00 13 295	19.00 13 315
13.00 13 223	14.00 13 243	15.00 13 263	16.00 13 283	17.00 13 303	18.00 13 323
12.00 13 232	13.00 13 252	14.00 13 272	15.00 13 292	16.00 13 312	17.00 13 332
11.00 13 240	12.00 13 260	13.00 13 280	14.00 13 300	15.00 13 320	16.00 13 340
10.00 13 249	11.00 13 269	12.00 13 289	13.00 13 309	14.00 13 329	15.00 13 349
9.00 13 257	10.00 13 277	11.00 13 297	12.00 13 317	13.00 13 337	14.00 13 357
8.00 13 266	9.00 13 286	10.00 13 306	11.00 13 326	12.00 13 346	13.00 13 366
7.00 13 274	8.00 13 294	9.00 13 314	10.00 13 334	11.00 13 354	12.00 13 374
6.00 13 283	7.00 13 303	8.00 13 323	9.00 13 343	10.00 13 363	11.00 13 383
5.00 13 291	6.00 13 311	7.00 13 331	8.00 13 351	9.00 13 371	10.00 13 391
4.00 13 300	5.00 13 320	6.00 13 340	7.00 13 360	8.00 13 380	9.00 13 400
3.00 13 308	4.00 13 328	5.00 13 348	6.00 13 368	7.00 13 388	8.00 13 408
2.00 13 317	3.00 13 337	4.00 13 357	5.00 13 377	6.00 13 397	7.00 13 417
1.00 13 325	2.00 13 345	3.00 13 365	4.00 13 385	5.00 13 405	6.00 13 425
0.00 13 334	1.00 13 354	2.00 13 374	3.00 13 394	4.00 13 414	5.00 13 434

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR MONOTONIC GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -5.00 LONG. = 160.00	GEOGRAPHIC LAT. = -5.00 LONG. = 195.00	GEOGRAPHIC LAT. = -5.00 LONG. = 210.00	GEOGRAPHIC LAT. = -5.00 LONG. = 225.00	GEOGRAPHIC LAT. = -5.00 LONG. = 240.00	GEOGRAPHIC LAT. = -5.00 LONG. = 255.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 -4 293	21.00 -2 -54	20.00 -8 -42	20.00 -9 -30	20.00 -10 -18	20.00 -9 -7
19.00 -4 304	19.00 -5 -44	19.00 -7 -32	19.00 -8 -20	19.00 -9 -9	19.00 -8 1
18.00 -4 318	18.00 -5 -30	18.00 -6 -19	18.00 -6 -9	18.00 -6 1	18.00 -6 11
17.00 -5 339	17.00 -4 -11	17.00 -3 -2	17.00 -3 7	17.00 -3 15	17.00 -2 23
16.00 -5 342	16.00 -4 -8	16.00 -3 1	16.00 2 32	16.00 3 36	16.00 3 48
15.00 -5 345	15.00 -4 -5	16.00 -3 3	15.00 3 35	15.00 4 38	15.00 4 42
14.00 -6 349	14.00 -4 -2	16.00 -2 5	15.00 4 33	15.00 5 41	15.00 5 44
13.00 -6 352	13.00 -3 1	16.00 -2 8	15.00 5 43	15.00 6 44	15.00 6 47
12.00 -6 356	13.00 -3 4	16.00 -2 11	15.00 6 47	15.00 7 51	15.00 7 52
11.00 -6 360	12.00 -3 8	16.00 -1 14	15.00 7 53	15.00 8 58	15.00 8 59
10.00 -6 365	11.00 -3 12	16.00 -1 17	15.00 8 58	15.00 9 55	15.00 9 55
9.00 -6 370	10.00 -3 16	16.00 0 20	15.00 10 65	15.00 10 60	15.00 10 61
8.00 -6 376	9.00 -2 21	16.00 0 24	15.00 11 73	15.00 11 65	15.00 11 65
7.00 -6 383	8.00 -2 26	16.00 1 26	15.00 13 84	15.00 12 70	15.00 12 69
6.00 -5 391	7.00 -1 32	15.00 2 33	15.00 14 97	15.00 14 77	15.00 13 73
5.00 -5 400	6.00 0 39	15.00 3 38	14.00 13 117	14.00 15 65	14.00 14 78
4.00 -5 413	5.00 1 47	15.00 4 43	14.00 6 155	14.00 16 95	14.00 15 84
3.00 -5 438	4.00 3 58	15.00 5 50	14.00 16 162	14.00 16 107	14.00 15 84
2.00 -5 462	3.00 7 71	15.00 6 56	14.00 16 169	14.00 16 125	14.00 16 91
1.00 -5 468	2.00 11 92	15.00 8 67	14.00 16 179	14.00 16 154	14.00 17 99
0.00 -5 474	1.00 14 136	15.00 10 79	14.00 16 189	14.00 16 158	14.00 17 109
15.47 16 481	15.47 13 145	15.00 12 97	14.76 -5 192	14.48 2 163	14.30 16 121
15.47 16 490	15.28 11 156	15.00 12 120	14.75 -6 213	14.07 0 169	14.20 12 138
15.45 17 501	15.27 6 170	15.00 12 133	14.74 -8 237	14.46 -2 175	14.18 2 165
15.43 17 516	15.26 -2 192	15.00 12 145	14.45 -4 183	14.45 -4 183	14.09 0 169
15.43 17 537	15.23 -12 238	15.00 11 139	14.44 -7 193	14.44 -7 193	14.08 -2 174
15.42 -15 567	15.24 8 182	15.00 8 122	14.43 -9 207	14.43 -9 207	14.07 -4 174
		15.00 6 121	14.42 -9 229	14.42 -9 229	14.06 -6 195
		15.00 3 173	14.41 -1 276	14.41 -1 276	14.05 -8 192
		15.00 -2 189	14.40 R	14.40 R	14.04 -10 211
		15.01 R			14.03 -11 213
					14.02 -11 218
					14.01 -8 258
					14.00 R

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -10.00 LONG. = 0.00		GEOGRAPHIC LAT. = -10.00 LONG. = 15.00		GEOGRAPHIC LAT. = -10.20 LONG. = 30.00		GEOGRAPHIC LAT. = -10.00 LONG. = 45.00		GEOGRAPHIC LAT. = -10.00 LONG. = 60.00		GEOGRAPHIC LAT. = -10.00 LONG. = 75.00	
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 16 74	23.00 10 91	20.00 17 109	20.00 18 133	20.00 19 151	20.00 19 173	20.00 19 191	20.00 19 213	20.00 19 235	20.00 19 257	20.00 19 279	20.00 19 301
19.00 17 80	19.00 17 97	19.00 18 116	19.00 19 137	19.00 19 159	19.00 19 181	19.00 19 199	19.00 19 221	19.00 19 243	19.00 19 265	19.00 19 287	19.00 19 309
18.00 18 67	18.00 18 104	18.00 19 123	18.00 19 145	18.00 19 167	18.00 19 189	18.00 19 211	18.00 19 233	18.00 19 255	18.00 19 277	18.00 19 299	18.00 19 321
17.00 18 55	17.00 18 112	17.00 19 131	17.00 19 156	17.00 19 178	17.00 19 200	17.00 19 222	17.00 19 244	17.00 19 266	17.00 19 288	17.00 19 310	17.00 19 332
16.00 18 105	16.00 18 123	16.00 18 145	16.00 18 170	16.00 18 192	16.00 18 214	16.00 18 236	16.00 18 258	16.00 18 280	16.00 18 302	16.00 18 324	16.00 18 346
15.00 17 114	15.00 18 137	15.00 14 161	15.00 16 189	15.00 16 211	15.00 16 233	15.00 16 255	15.00 16 277	15.00 16 299	15.00 16 321	15.00 16 343	15.00 16 365
14.00 17 137	14.00 10 157	14.00 4 184	14.00 7 182	14.00 6 184	14.00 6 184	14.00 6 184	14.00 6 184	14.00 6 184	14.00 6 184	14.00 6 184	14.00 6 184
13.00 10 139	13.00 7 159	13.00 3 187	13.00 6 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184
13.00 9 141	13.00 7 162	13.00 3 190	13.00 6 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184	13.00 4 184
12.00 8 144	12.00 6 165	12.00 1 194	12.00 4 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184
11.00 7 147	11.00 5 168	11.00 1 194	11.00 4 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184
10.00 6 149	10.00 3 171	10.00 1 194	10.00 4 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184
9.00 5 152	9.00 2 174	9.00 1 194	9.00 4 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184
8.00 3 156	8.00 0 176	8.00 1 194	8.00 4 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184
7.00 2 159	7.00 1 182	7.00 1 194	7.00 4 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184
6.00 0 163	6.00 1 192	6.00 1 194	6.00 4 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184
5.00 1 167	5.00 1 192	5.00 1 194	5.00 4 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184
4.00 3 172	4.00 1 199	4.00 1 194	4.00 4 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184
3.00 5 174	3.00 1 206	3.00 1 194	3.00 4 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184
2.00 7 184	2.00 1 216	2.00 1 194	2.00 4 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184
1.00 9 182	1.00 1 224	1.00 1 194	1.00 4 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184
0.00 10 182	0.00 1 246	0.00 1 194	0.00 4 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184
12.00 11 215	12.00 1 275	12.00 1 194	12.00 4 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184
11.00 9 234	11.00 1 280	11.00 1 194	11.00 4 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184	11.00 3 184
10.00 9 268	10.00 1 291	10.00 1 194	10.00 4 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184	10.00 3 184
9.00 10 273	9.00 1 297	9.00 1 194	9.00 4 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184	9.00 3 184
8.00 12 288	8.00 1 304	8.00 1 194	8.00 4 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184	8.00 3 184
7.00 12 317	7.00 1 315	7.00 1 194	7.00 4 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184	7.00 3 184
6.00 12 346	6.00 1 322	6.00 1 194	6.00 4 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184	6.00 3 184
5.00 12 375	5.00 1 327	5.00 1 194	5.00 4 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184	5.00 3 184
4.00 12 404	4.00 1 332	4.00 1 194	4.00 4 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184	4.00 3 184
3.00 12 433	3.00 1 337	3.00 1 194	3.00 4 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184	3.00 3 184
2.00 12 462	2.00 1 342	2.00 1 194	2.00 4 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184	2.00 3 184
1.00 12 491	1.00 1 347	1.00 1 194	1.00 4 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184	1.00 3 184
0.00 12 520	0.00 1 352	0.00 1 194	0.00 4 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184	0.00 3 184
12.00 12 549	12.00 1 357	12.00 1 194	12.00 4 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184	12.00 3 184

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOMAGNETIC LAT. = -10.00 LONG. = 180.00	GEOMAGNETIC LAT. = -10.00 LONG. = 195.00	GEOMAGNETIC LAT. = -10.00 LONG. = 210.00	GEOMAGNETIC LAT. = -10.00 LONG. = 225.00	GEOMAGNETIC LAT. = -10.00 LONG. = 240.00	GEOMAGNETIC LAT. = -10.00 LONG. = 255.00
REG. ASYMPTOTIC (GV) LAT LONG	REG. ASYMPTOTIC (GV) LAT LONG	REG. ASYMPTOTIC (GV) LAT LONG	REG. ASYMPTOTIC (GV) LAT LONG	REG. ASYMPTOTIC (GV) LAT LONG	REG. ASYMPTOTIC (GV) LAT LONG
20.00 0 280	21.00 -3 -57	20.00 -4 -46	20.00 -6 -31	20.00 -6 -19	20.00 -6 -7
19.00 0 290	11.00 -2 -40	19.00 -3 -35	19.00 -4 -22	19.00 -5 -11	19.00 -6 -9
18.00 0 310	11.00 -1 -36	18.00 -2 -23	18.00 -2 -12	18.00 -2 -1	18.00 -2 -9
17.00 -7 328	17.00 -1 -19	17.00 -1 -7	17.00 0 3	17.00 0 13	17.00 1 21
16.00 -7 357	15.00 -1 10	16.00 0 18	16.00 3 26	16.00 5 32	16.00 6 38
15.00 -8 361	13.00 -3 16	15.00 0 22	15.00 3 29	15.00 5 35	15.00 12 66
15.00 -8 366	11.00 -4 16	14.00 0 26	15.00 4 32	15.00 6 37	14.00 12 78
15.00 -9 371	11.00 -4 24	15.00 1 30	15.00 4 36	15.00 6 40	14.00 13 75
15.00 -9 378	11.00 -4 29	15.00 1 35	15.00 4 40	15.00 7 43	14.00 14 80
15.00 -9 385	11.00 -4 36	15.00 1 40	15.00 5 44	15.00 7 47	14.00 14 86
15.00 -7 404	11.00 -3 44	15.00 2 46	15.00 5 48	15.00 8 50	14.00 14 93
15.00 -3 417	11.00 -2 53	15.00 2 53	15.00 6 54	15.00 9 59	14.00 14 102
15.00 6 436	11.00 1 65	15.00 3 62	15.00 7 60	15.00 9 59	14.00 13 112
15.00 21 476	11.00 6 81	15.00 8 72	15.00 7 67	15.00 10 66	14.00 11 125
14.00 22 446	11.00 14 109	15.00 7 86	15.00 8 75	15.00 10 69	14.00 7 144
14.00 22 493	11.00 15 113	14.00 10 107	14.00 9 86	14.00 11 76	14.00 -3 181
14.00 20 505	11.00 16 123	14.00 11 113	14.00 10 100	14.00 12 83	14.00 -5 188
14.00 14 521	14.00 17 129	14.00 12 117	14.00 10 121	14.00 12 92	14.00 -6 196
14.00 8 543	14.00 17 137	14.00 12 124	14.00 9 125	14.00 12 104	14.00 -7 206
14.00 -15 617	14.00 14 146	14.00 12 129	14.00 8 124	14.00 11 120	14.00 -7 219
	14.00 10 171	14.00 12 134	14.00 -2 208	14.00 7 145	14.00 -6 239
	14.00 0 192	14.00 12 148	14.00 -6 225	14.00 6 168	14.00 -3 280
	14.00 -3 247	14.00 12 146	14.00 -7 308	14.00 5 192	14.00 13 93
	14.00 -4	14.00 11 154	14.00	14.00 3 161	
		14.00 9 163		14.00 2 167	
		14.00 6 175		14.00 17 1	
		14.00 1 191		14.00 -1 181	
		14.00 -7 220		14.00 -3 198	
		14.00		14.00 -5 202	
		14.00		14.00 -6 220	
		14.00		14.00 -8 253	
				14.00	

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = -15.00 LONG. = 90.00		LAT. = -15.00 LONG. = 105.00		LAT. = -15.00 LONG. = 120.00		LAT. = -15.00 LONG. = 135.00		LAT. = -15.00 LONG. = 150.00		LAT. = -15.00 LONG. = 165.00	
RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG	
28.00	21 177	21.00	13 196	20.00	16 214	20.00	13 230	20.00	9 247	20.00	6 264
18.00	22 184	19.00	20 203	19.00	17 221	19.00	14 237	19.00	10 254	19.00	7 272
18.00	22 192	19.00	17 212	18.00	16 230	18.00	13 246	18.00	10 263	18.00	7 281
17.00	20 282	17.00	17 223	17.00	14 241	17.00	11 257	17.00	8 274	17.00	5 293
16.00	19 215	15.00	11 236	16.00	8 254	16.00	5 270	16.00	3 288	16.00	0 310
15.00	9 238	15.00	-11 252	15.00	-6 272	15.00	-7 283	15.00	-9 289	15.00	-11 306
14.00	-15 255	14.00	-1 254	14.00	-8 274	14.00	-9 291	14.00	-11 312	14.00	-13 308
13.00	-10 259	13.00	-5 257	13.00	-10 276	13.00	-11 294	13.00	-13 315	13.00	-14 304
12.00	-23 263	11.00	-7 259	12.00	-12 275	12.00	-11 294	12.00	-13 315	12.00	-14 304
11.00	-23 269	10.00	-1 262	11.00	-14 282	10.00	-15 300	10.00	-16 307	10.00	-17 304
10.00	-26 276	9.00	-12 264	9.00	-17 285	8.00	-17 303	8.00	-18 307	8.00	-19 301
9.00	-26 284	8.00	-14 267	8.00	-19 289	7.00	-20 307	7.00	-20 311	7.00	-20 308
8.00	-28 295	7.00	-17 271	7.00	-22 293	6.00	-22 311	6.00	-22 317	6.00	-23 307
7.00	-27 304	6.00	-19 275	6.00	-24 297	5.00	-24 317	5.00	-24 323	5.00	-24 303
6.00	-28 326	5.00	-22 279	5.00	-27 303	4.00	-26 323	4.00	-26 323	4.00	-26 303
5.00	-3 349	4.00	-23 285	4.00	-29 310	3.00	-28 330	3.00	-28 330	3.00	-28 303
4.00	-1 353	3.00	-27 291	3.00	-30 319	2.00	-28 334	2.00	-28 334	2.00	-28 303
3.00	2 356	2.00	-29 299	2.00	-30 329	1.00	-27 344	1.00	-27 344	1.00	-27 303
2.00	5 361	1.00	-30 309	1.00	-30 341	0.00	-27 341	0.00	-27 341	0.00	-27 303
1.00	9 365	0.00	-32 322	0.00	-30 356	-1.00	-27 356	-1.00	-27 356	-1.00	-27 303
0.00	12 372	-1.00	-23 337	-1.00	-30 374	-2.00	-27 374	-2.00	-27 374	-2.00	-27 303
0.00	16 379	-2.00	-23 359	-2.00	-30 392	-2.00	-27 392	-2.00	-27 392	-2.00	-27 303
0.00	19 389	-4.00	-23 379	-4.00	-30 404	-4.00	-27 404	-4.00	-27 404	-4.00	-27 303
0.00	20 404	-6.00	-23 399	-6.00	-30 413	-6.00	-27 413	-6.00	-27 413	-6.00	-27 303
0.00	20 425	-8.00	-23 421	-8.00	-30 425	-8.00	-27 425	-8.00	-27 425	-8.00	-27 303
0.00	17 428	-10.00	-23 441	-10.00	-30 441	-10.00	-27 441	-10.00	-27 441	-10.00	-27 303
0.00	2 466	-12.00	-23 461	-12.00	-30 461	-12.00	-27 461	-12.00	-27 461	-12.00	-27 303
0.00	R	-14.00	-23 481	-14.00	-30 481	-14.00	-27 481	-14.00	-27 481	-14.00	-27 303
0.00	R	-16.00	-23 501	-16.00	-30 501	-16.00	-27 501	-16.00	-27 501	-16.00	-27 303
0.00	R	-18.00	-23 521	-18.00	-30 521	-18.00	-27 521	-18.00	-27 521	-18.00	-27 303
0.00	R	-20.00	-23 541	-20.00	-30 541	-20.00	-27 541	-20.00	-27 541	-20.00	-27 303
0.00	R	-22.00	-23 561	-22.00	-30 561	-22.00	-27 561	-22.00	-27 561	-22.00	-27 303
0.00	R	-24.00	-23 581	-24.00	-30 581	-24.00	-27 581	-24.00	-27 581	-24.00	-27 303
0.00	R	-26.00	-23 601	-26.00	-30 601	-26.00	-27 601	-26.00	-27 601	-26.00	-27 303
0.00	R	-28.00	-23 621	-28.00	-30 621	-28.00	-27 621	-28.00	-27 621	-28.00	-27 303
0.00	R	-30.00	-23 641	-30.00	-30 641	-30.00	-27 641	-30.00	-27 641	-30.00	-27 303
0.00	R	-32.00	-23 661	-32.00	-30 661	-32.00	-27 661	-32.00	-27 661	-32.00	-27 303
0.00	R	-34.00	-23 681	-34.00	-30 681	-34.00	-27 681	-34.00	-27 681	-34.00	-27 303
0.00	R	-36.00	-23 701	-36.00	-30 701	-36.00	-27 701	-36.00	-27 701	-36.00	-27 303
0.00	R	-38.00	-23 721	-38.00	-30 721	-38.00	-27 721	-38.00	-27 721	-38.00	-27 303
0.00	R	-40.00	-23 741	-40.00	-30 741	-40.00	-27 741	-40.00	-27 741	-40.00	-27 303
0.00	R	-42.00	-23 761	-42.00	-30 761	-42.00	-27 761	-42.00	-27 761	-42.00	-27 303
0.00	R	-44.00	-23 781	-44.00	-30 781	-44.00	-27 781	-44.00	-27 781	-44.00	-27 303
0.00	R	-46.00	-23 801	-46.00	-30 801	-46.00	-27 801	-46.00	-27 801	-46.00	-27 303
0.00	R	-48.00	-23 821	-48.00	-30 821	-48.00	-27 821	-48.00	-27 821	-48.00	-27 303
0.00	R	-50.00	-23 841	-50.00	-30 841	-50.00	-27 841	-50.00	-27 841	-50.00	-27 303
0.00	R	-52.00	-23 861	-52.00	-30 861	-52.00	-27 861	-52.00	-27 861	-52.00	-27 303
0.00	R	-54.00	-23 881	-54.00	-30 881	-54.00	-27 881	-54.00	-27 881	-54.00	-27 303
0.00	R	-56.00	-23 901	-56.00	-30 901	-56.00	-27 901	-56.00	-27 901	-56.00	-27 303
0.00	R	-58.00	-23 921	-58.00	-30 921	-58.00	-27 921	-58.00	-27 921	-58.00	-27 303
0.00	R	-60.00	-23 941	-60.00	-30 941	-60.00	-27 941	-60.00	-27 941	-60.00	-27 303
0.00	R	-62.00	-23 961	-62.00	-30 961	-62.00	-27 961	-62.00	-27 961	-62.00	-27 303
0.00	R	-64.00	-23 981	-64.00	-30 981	-64.00	-27 981	-64.00	-27 981	-64.00	-27 303
0.00	R	-66.00	-24 001	-66.00	-30 001	-66.00	-27 001	-66.00	-27 001	-66.00	-27 303
0.00	R	-68.00	-24 021	-68.00	-30 021	-68.00	-27 021	-68.00	-27 021	-68.00	-27 303
0.00	R	-70.00	-24 041	-70.00	-30 041	-70.00	-27 041	-70.00	-27 041	-70.00	-27 303
0.00	R	-72.00	-24 061	-72.00	-30 061	-72.00	-27 061	-72.00	-27 061	-72.00	-27 303
0.00	R	-74.00	-24 081	-74.00	-30 081	-74.00	-27 081	-74.00	-27 081	-74.00	-27 303
0.00	R	-76.00	-24 101	-76.00	-30 101	-76.00	-27 101	-76.00	-27 101	-76.00	-27 303
0.00	R	-78.00	-24 121	-78.00	-30 121	-78.00	-27 121	-78.00	-27 121	-78.00	-27 303
0.00	R	-80.00	-24 141	-80.00	-30 141	-80.00	-27 141	-80.00	-27 141	-80.00	-27 303
0.00	R	-82.00	-24 161	-82.00	-30 161	-82.00	-27 161	-82.00	-27 161	-82.00	-27 303
0.00	R	-84.00	-24 181	-84.00	-30 181	-84.00	-27 181	-84.00	-27 181	-84.00	-27 303
0.00	R	-86.00	-24 201	-86.00	-30 201	-86.00	-27 201	-86.00	-27 201	-86.00	-27 303
0.00	R	-88.00	-24 221	-88.00	-30 221	-88.00	-27 221	-88.00	-27 221	-88.00	-27 303
0.00	R	-90.00	-24 241	-90.00	-30 241	-90.00	-27 241	-90.00	-27 241	-90.00	-27 303
0.00	R	-92.00	-24 261	-92.00	-30 261	-92.00	-27 261	-92.00	-27 261	-92.00	-27 303
0.00	R	-94.00	-24 281	-94.00	-30 281	-94.00	-27 281	-94.00	-27 281	-94.00	-27 303
0.00	R	-96.00	-24 301	-96.00	-30 301	-96.00	-27 301	-96.00	-27 301	-96.00	-27 303
0.00	R	-98.00	-24 321	-98.00	-30 321	-98.00	-27 321	-98.00	-27 321	-98.00	-27 303
0.00	R	-100.00	-24 341	-100.00	-30 341	-100.00	-27 341	-100.00	-27 341	-100.00	-27 303
0.00	R	-102.00	-24 361	-102.00	-30 361	-102.00	-27 361	-102.00	-27 361	-102.00	-27 303
0.00	R	-104.00	-24 381	-104.00	-30 381	-104.00	-27 381	-104.00	-27 381	-104.00	-27 303
0.00	R	-106.00	-24 401	-106.00	-30 401	-106.00	-27 401	-106.00	-27 401	-106.00	-27 303
0.00	R	-108.00	-24 421	-108.00	-30 421	-108.00	-27 421	-108.00	-27 421	-108.00	-27 303
0.00	R	-110.00	-24 441	-110.00	-30 441	-110.00	-27 441	-110.00	-27 441	-110.00	-27 303
0.00	R	-112.00	-24 461	-112.00	-30 461	-112.00	-27 461	-112.00	-27 461	-112.00	-27 303
0.00	R	-114.00	-24 481	-114.00	-30 481	-114.00	-27 481	-114.00	-27 481	-114.00	-27 303
0.00	R	-116.00	-24 501	-116.00	-30 501	-116.00	-27 501	-116.00	-27 501	-116.00	-27 303
0.00	R	-118.00	-24 521	-118.00	-30 521	-118.00	-27 521	-118.00	-27 521	-118.00	-27 303
0.00	R	-120.00	-24 541	-120.00	-30 541	-120.00	-27 541	-120.00	-27 541	-120.00	-27 303
0.00	R	-122.00	-24 561	-122.00	-30 561	-122.00	-27 561	-122.00	-27 561	-122.00	-27 303
0.00	R	-124.00	-24 581	-124.00	-30 581	-124.00	-27 581	-124.00	-27 581	-124.00	-27 303
0.00	R	-126.00	-24 601	-126.00	-30 601	-126.00	-27 601	-126.00	-27 601	-126.00	-27 303
0.00	R	-128.00	-24 621	-128.00	-30 621	-128.00	-27 621	-128.00	-27 621	-128.00	-27 303
0.00	R	-130.00	-24 641	-130.00	-30 641	-130.00	-27 641	-130.00	-27 641	-130.00	-27 303
0.00	R	-132.00	-24 661	-132.00	-30 661	-132.00	-27 661	-132.00	-27 661	-132.00	-27 303
0.00	R	-134.00	-24 681	-134.00	-30 681	-134.00	-27 681	-134.00	-27 681	-134.00	-27 303
0.00	R	-136.00	-24 701	-136.00	-30 701	-136.00	-27 701	-136.00	-27 701	-136.00	-27 303
0.00	R	-138.00	-24 721	-138.00	-30 721	-138.00	-27 721	-138.00	-27 721	-138.00	-27 303
0.00	R	-140.00	-24 741	-140.00	-30 741	-140.00	-27 741	-140.00	-27 741	-140.00	-27 303
0.00	R	-142.00	-24 761	-142.00	-30 761	-142.00	-27 761	-142.00	-27 761	-142.00	-27 303
0.00	R	-144.00	-24 781	-144.00	-30 781	-144.00	-27 781	-144.00	-27 781		

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC (GV) LAT LONG		GEOGRAPHIC (GV) LAT LONG		GEOGRAPHIC (GV) LAT LONG		GEOGRAPHIC (GV) LAT LONG		GEOGRAPHIC (GV) LAT LONG		GEOGRAPHIC (GV) LAT LONG		GEOGRAPHIC (GV) LAT LONG		GEOGRAPHIC (GV) LAT LONG	
ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC	
20.00	3 201	21.00	0 -63	20.00	-2 -46	20.00	-3 -35	20.00	-4 -22	20.00	-4 -19	20.00	-4 -19	20.00	-4 -19
19.00	4 209	19.00	2 -55	19.00	0 -40	19.00	-1 -27	19.00	-2 -14	19.00	-2 -14	19.00	-2 -14	19.00	-2 -14
18.00	4 299	18.00	2 -45	18.00	1 -30	18.00	1 -17	18.00	0 -5	18.00	0 -5	18.00	0 -5	18.00	0 -5
17.00	3 312	17.00	2 -31	17.00	2 -17	17.00	3 -4	17.00	3 7	17.00	3 7	17.00	3 7	17.00	3 7
16.00	-1 331	16.00	0 -11	16.00	2 3	16.00	4 15	16.00	6 24	16.00	6 24	16.00	6 24	16.00	6 24
15.00	-2 333	15.00	-1 -6	15.00	2 5	15.00	4 17	15.00	9 53	15.00	9 53	15.00	9 53	15.00	9 53
14.00	-2 336	14.00	-1 -6	14.00	2 6	14.00	4 19	14.00	9 58	14.00	9 58	14.00	9 58	14.00	9 58
13.00	-3 339	13.00	-2 -3	13.00	1 11	13.00	4 27	13.00	9 62	13.00	9 62	13.00	9 62	13.00	9 62
12.00	-4 341	12.00	-2 0	12.00	1 14	12.00	4 25	12.00	9 68	12.00	9 68	12.00	9 68	12.00	9 68
11.00	-5 345	11.00	-1 4	11.00	1 17	11.00	4 28	11.00	9 74	11.00	9 74	11.00	9 74	11.00	9 74
10.00	-6 348	10.00	-1 7	10.00	0 21	10.00	5 31	10.00	9 81	10.00	9 81	10.00	9 81	10.00	9 81
9.00	-7 351	9.00	-1 11	9.00	0 25	9.00	5 35	9.00	9 88	9.00	9 88	9.00	9 88	9.00	9 88
8.00	-8 355	8.00	-1 16	8.00	0 29	8.00	5 39	8.00	9 98	8.00	9 98	8.00	9 98	8.00	9 98
7.00	-9 359	7.00	-1 20	7.00	-1 34	7.00	5 43	7.00	10 1	7.00	10 1	7.00	10 1	7.00	10 1
6.00	-10 363	6.00	-1 26	6.00	-1 39	6.00	5 48	6.00	11 5	6.00	11 5	6.00	11 5	6.00	11 5
5.00	-11 366	5.00	-1 32	5.00	-1 45	5.00	5 53	5.00	12 96	5.00	12 96	5.00	12 96	5.00	12 96
4.00	-12 370	4.00	-1 39	4.00	-1 52	4.00	5 58	4.00	13 98	4.00	13 98	4.00	13 98	4.00	13 98
3.00	-13 376	3.00	-1 48	3.00	-2 00	3.00	6 03	3.00	14 00	3.00	14 00	3.00	14 00	3.00	14 00
2.00	-14 383	2.00	-1 58	2.00	-2 08	2.00	6 08	2.00	15 02	2.00	15 02	2.00	15 02	2.00	15 02
1.00	-15 391	1.00	-2 07	1.00	-2 17	1.00	6 13	1.00	16 04	1.00	16 04	1.00	16 04	1.00	16 04
0.00	-16 399	0.00	-2 17	0.00	-2 28	0.00	6 18	0.00	17 06	0.00	17 06	0.00	17 06	0.00	17 06
-1.00	-17 407	-1.00	-2 28	-1.00	-2 39	-1.00	6 23	-1.00	18 08	-1.00	18 08	-1.00	18 08	-1.00	18 08
-2.00	-18 416	-2.00	-2 39	-2.00	-2 50	-2.00	6 28	-2.00	19 10	-2.00	19 10	-2.00	19 10	-2.00	19 10
-3.00	-19 425	-3.00	-2 50	-3.00	-3 01	-3.00	6 33	-3.00	20 12	-3.00	20 12	-3.00	20 12	-3.00	20 12
-4.00	-20 434	-4.00	-3 01	-4.00	-3 12	-4.00	6 38	-4.00	21 14	-4.00	21 14	-4.00	21 14	-4.00	21 14
-5.00	-21 443	-5.00	-3 12	-5.00	-3 23	-5.00	6 43	-5.00	22 16	-5.00	22 16	-5.00	22 16	-5.00	22 16
-6.00	-22 452	-6.00	-3 23	-6.00	-3 34	-6.00	6 48	-6.00	23 18	-6.00	23 18	-6.00	23 18	-6.00	23 18
-7.00	-23 461	-7.00	-3 34	-7.00	-3 45	-7.00	6 53	-7.00	24 20	-7.00	24 20	-7.00	24 20	-7.00	24 20
-8.00	-24 470	-8.00	-3 45	-8.00	-3 56	-8.00	6 58	-8.00	25 22	-8.00	25 22	-8.00	25 22	-8.00	25 22
-9.00	-25 479	-9.00	-3 56	-9.00	-4 07	-9.00	7 03	-9.00	26 24	-9.00	26 24	-9.00	26 24	-9.00	26 24
-10.00	-26 488	-10.00	-4 07	-10.00	-4 18	-10.00	7 08	-10.00	27 26	-10.00	27 26	-10.00	27 26	-10.00	27 26
-11.00	-27 497	-11.00	-4 18	-11.00	-4 29	-11.00	7 13	-11.00	28 28	-11.00	28 28	-11.00	28 28	-11.00	28 28
-12.00	-28 506	-12.00	-4 29	-12.00	-4 40	-12.00	7 18	-12.00	29 30	-12.00	29 30	-12.00	29 30	-12.00	29 30
-13.00	-29 515	-13.00	-4 40	-13.00	-4 51	-13.00	7 23	-13.00	30 32	-13.00	30 32	-13.00	30 32	-13.00	30 32
-14.00	-30 524	-14.00	-4 51	-14.00	-5 02	-14.00	7 28	-14.00	31 34	-14.00	31 34	-14.00	31 34	-14.00	31 34
-15.00	-31 533	-15.00	-5 02	-15.00	-5 13	-15.00	7 33	-15.00	32 36	-15.00	32 36	-15.00	32 36	-15.00	32 36
-16.00	-32 542	-16.00	-5 13	-16.00	-5 24	-16.00	7 38	-16.00	33 38	-16.00	33 38	-16.00	33 38	-16.00	33 38
-17.00	-33 551	-17.00	-5 24	-17.00	-5 35	-17.00	7 43	-17.00	34 40	-17.00	34 40	-17.00	34 40	-17.00	34 40
-18.00	-34 560	-18.00	-5 35	-18.00	-5 46	-18.00	7 48	-18.00	35 42	-18.00	35 42	-18.00	35 42	-18.00	35 42
-19.00	-35 569	-19.00	-5 46	-19.00	-5 57	-19.00	7 53	-19.00	36 44	-19.00	36 44	-19.00	36 44	-19.00	36 44
-20.00	-36 578	-20.00	-5 57	-20.00	-6 08	-20.00	7 58	-20.00	37 46	-20.00	37 46	-20.00	37 46	-20.00	37 46
-21.00	-37 587	-21.00	-6 08	-21.00	-6 19	-21.00	8 03	-21.00	38 48	-21.00	38 48	-21.00	38 48	-21.00	38 48
-22.00	-38 596	-22.00	-6 19	-22.00	-6 30	-22.00	8 08	-22.00	39 50	-22.00	39 50	-22.00	39 50	-22.00	39 50
-23.00	-39 605	-23.00	-6 30	-23.00	-6 41	-23.00	8 13	-23.00	40 52	-23.00	40 52	-23.00	40 52	-23.00	40 52
-24.00	-40 614	-24.00	-6 41	-24.00	-6 52	-24.00	8 18	-24.00	41 54	-24.00	41 54	-24.00	41 54	-24.00	41 54
-25.00	-41 623	-25.00	-6 52	-25.00	-7 03	-25.00	8 23	-25.00	42 56	-25.00	42 56	-25.00	42 56	-25.00	42 56
-26.00	-42 632	-26.00	-7 03	-26.00	-7 14	-26.00	8 28	-26.00	43 58	-26.00	43 58	-26.00	43 58	-26.00	43 58
-27.00	-43 641	-27.00	-7 14	-27.00	-7 25	-27.00	8 33	-27.00	44 60	-27.00	44 60	-27.00	44 60	-27.00	44 60
-28.00	-44 650	-28.00	-7 25	-28.00	-7 36	-28.00	8 38	-28.00	45 62	-28.00	45 62	-28.00	45 62	-28.00	45 62
-29.00	-45 659	-29.00	-7 36	-29.00	-7 47	-29.00	8 43	-29.00	46 64	-29.00	46 64	-29.00	46 64	-29.00	46 64
-30.00	-46 668	-30.00	-7 47	-30.00	-7 58	-30.00	8 48	-30.00	47 66	-30.00	47 66	-30.00	47 66	-30.00	47 66
-31.00	-47 677	-31.00	-7 58	-31.00	-8 09	-31.00	8 53	-31.00	48 68	-31.00	48 68	-31.00	48 68	-31.00	48 68
-32.00	-48 686	-32.00	-8 09	-32.00	-8 20	-32.00	8 58	-32.00	49 70	-32.00	49 70	-32.00	49 70	-32.00	49 70
-33.00	-49 695	-33.00	-8 20	-33.00	-8 31	-33.00	9 03	-33.00	50 72	-33.00	50 72	-33.00	50 72	-33.00	50 72
-34.00	-50 704	-34.00	-8 31	-34.00	-8 42	-34.00	9 08	-34.00	51 74	-34.00	51 74	-34.00	51 74	-34.00	51 74
-35.00	-51 713	-35.00	-8 42	-35.00	-8 53	-35.00	9 13	-35.00	52 76	-35.00	52 76	-35.00	52 76	-35.00	52 76
-36.00	-52 722	-36.00	-8 53	-36.00	-9 04	-36.00	9 18	-36.00	53 78	-36.00	53 78	-36.00	53 78	-36.00	53 78
-37.00	-53 731	-37.00	-9 04	-37.00	-9 15	-37.00	9 23	-37.00	54 80	-37.00	54 80	-37.00	54 80	-37.00	54 80
-38.00	-54 740	-38.00	-9 15	-38.00	-9 26	-38.00	9 28	-38.00	55 82	-38.00	55 82	-38.00	55 82	-38.00	55 82
-39.00	-55 749	-39.00	-9 26	-39.00	-9 37	-39.00	9 33	-39.00	56 84	-39.00	56 84	-39.00	56 84	-39.00	56 84
-40.00	-56 758	-40.00	-9 37	-40.00	-9 48	-40.00	9 38	-40.00	57 86	-40.00	57 86	-40.00	57 86	-40.00	57 86
-41.00	-57 767	-41.00	-9 48	-41.00	-9 59	-41.00	9 43	-41.00	58 88	-41.00	58 88	-41.00	58 88	-41.00	58 88
-42.00	-58 776	-42.00	-9 59	-42.00	-10 10	-42.00	9 48	-42.00	59 90	-42.00	59 90	-42.00	59 90	-42.00	59 90
-43.00	-59 785	-43.00	-10 10	-43.00	-10 21	-43.00	9 53	-43.00	60 92	-43.00	60 92	-43.00	60 92	-43.00	60 92
-44.00	-60 794	-44.00	-10 21	-44.00	-10 32	-44.00	9 58	-44.00	61 94	-44.00	61 94	-44.00	61 94	-44.00	61 94
-45.00	-61 803	-45.00	-10 32	-45.00	-10 43	-45.00	10 03	-45.00	62 96	-45.00	62 96	-45.00	62 96	-45.00	62 96
-46.00	-62 812	-46.00	-10 43	-46.00	-10 54	-46.00	10 08	-46.00	63 98	-46.00	63 98	-46.00	63 98	-46.00	63 98
-47.00	-63 821	-47.00	-10 54	-47.00	-11 05	-47.00	10 13	-47.00	64 100	-47.00	64 100	-47.00	64 100	-47.00	64 100
-48.00	-64 830	-48.00	-11 05	-48.00	-11 16	-48.00	10 18	-48.00	65 102	-48.00	65 102	-48.00	65 102	-48.00	65 102
-49.00	-65 839	-49.00	-11 16	-49.00	-11 27	-49.00	10 23	-49.00	66 104	-49.00	66 104	-49.00	66 104	-49.00	66 104
-50.00	-66 848	-50.00	-11 27	-50.00	-11 38	-50.00	10 28	-50.00	67 106	-50.00	67 106	-50.00	67 106	-50.00	67 106
-51.00	-67 857	-51.00	-11 38	-51.00	-11 49	-51.00	10 33	-51.00	68 108	-51.00	68 108	-51.00	68 108	-51.00	68 108
-52.00	-68 866	-52.00	-11 49	-52.00	-12 00	-52.00	10 38	-52.00	69 110	-52.00	69 110	-52.00	69 110	-5	

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOMAGNETIC LAT. = -15.00 LONG. = 278.00	GEOMAGNETIC LAT. = -15.00 LONG. = 285.00	GEOMAGNETIC LAT. = -15.00 LONG. = 300.00	GEOMAGNETIC LAT. = -15.00 LONG. = 315.00	GEOMAGNETIC LAT. = -15.00 LONG. = 330.00	GEOMAGNETIC LAT. = -15.00 LONG. = 345.00
MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG	MIG ASYMPTOTIC (GV) LAT LONG
20.00 -3 1	21.00 0 11	20.00 5 21	20.00 11 31	20.00 17 41	20.00 15 52
18.00 -1 7	19.00 5 17	18.00 7 26	19.00 12 37	19.00 15 46	19.00 17 57
16.00 2 15	15.00 5 24	16.00 9 31	16.00 13 43	16.00 17 52	16.00 18 42
17.00 5 25	17.00 7 33	17.00 11 40	17.00 15 51	17.00 18 60	17.00 19 49
18.00 9 38	18.00 10 44	18.00 13 51	18.00 16 62	18.00 19 69	18.00 20 77
19.00 13 50	19.00 13 61	19.00 16 68	19.00 18 76	19.00 20 82	19.00 20 88
16.00 13 61	16.00 13 69	16.00 13 92	16.00 13 96	16.00 15 99	16.00 16 103
15.00 14 63	15.00 14 94	15.00 13 95	15.00 12 99	15.00 6 124	15.00 12 122
14.00 14 66	14.00 14 98	14.00 12 98	14.00 12 107	14.00 5 128	14.00 11 125
16.70 14 70	16.70 15 103	16.70 12 102	16.70 11 105	16.70 3 132	16.70 10 127
14.50 15 73	14.50 12 109	14.50 11 106	14.50 10 106	14.50 1 136	14.50 8 138
16.40 15 77	16.40 11 115	16.40 10 111	16.40 9 111	16.40 7 131	16.40 7 131
14.30 15 81	14.30 1 122	14.30 9 115	14.30 8 115	14.30 -1 141	14.30 5 136
13.20 15 86	13.20 7 131	13.20 6 121	13.20 7 119	13.20 -5 153	13.20 4 140
16.10 14 91	16.10 6 142	16.10 6 127	16.10 5 123	16.10 -7 161	16.10 2 143
15.00 14 97	15.00 8 157	15.00 4 134	15.00 4 126	15.00 -8 171	15.00 0 147
13.00 13 103	13.00 -5 182	13.00 2 143	13.00 7 133	13.00 -9 185	13.00 -2 182
13.00 12 111	13.00 -5 185	13.00 -1 154	13.00 0 140	13.00 -6 204	13.00 -4 197
13.70 10 120	13.70 -6 189	13.70 -5 170	13.70 -2 147	13.70 3 242	13.70 -7 163
13.00 7 132	13.00 -6 194	13.00 -5 196	13.00 -4 157	13.00 4 248	13.00 -9 171
13.50 2 147	13.50 -6 199	13.50 -5 200	13.50 -5 164	13.50 4 256	13.50 -10 189
13.40 -4 174	13.40 -6 204	13.40 -5 204	13.40 -6 186	13.40 5 266	13.40 -11 192
13.30 -4 178	13.30 -6 211	13.30 -4 209	13.30 -2 217	13.30 1 279	13.30 -9 208
13.30 -5 183	13.30 -6 218	13.30 -4 214	13.30 -2 221	13.30 -2 290	13.30 -3 215
13.37 -5 188	13.37 -4 228	13.37 -3 228	13.37 -1 227	13.37 -16 334	13.37 -1 239
13.36 -6 194	13.36 -3 240	13.36 -2 235	13.36 0 233	13.36 1 240	13.36 1 240
13.35 -6 201	13.35 -1 258	13.35 -2 235	13.35 1 240	13.35 2 249	13.35 2 236
13.34 -6 209	13.34 -2 269	13.34 -1 246	13.34 2 260	13.34 4 268	13.34 4 268
13.32 -4 234	13.32 -1 283	13.32 -1 283	13.32 3 276	13.32 5 277	13.32 5 277
13.31 -2 256	13.31 -12 337	13.31 -12 337	13.31 -5 301	13.31 3 289	13.31 3 289
13.30 -4 305	13.30 -10 304	13.30 -10 304	13.30 -10 304	13.30 -12 316	13.30 -12 316
13.29 -4 305	13.29 -10 304	13.29 -10 304	13.29 -10 304	13.29 -12 316	13.29 -12 316
13.28 -4 305	13.28 -10 304	13.28 -10 304	13.28 -10 304	13.28 -12 316	13.28 -12 316

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = -20.00		LAT. = -20.00		LAT. = -20.00		LAT. = -20.00		LAT. = -20.00		LAT. = -20.00		LAT. = -20.00	
LONG. = 0.00		LONG. = 50.00		LONG. = 45.00		LONG. = 60.00		LONG. = 75.00		LONG. = 90.00		LONG. = 105.00	
RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC
(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG	(GV)	LAT LONG
20.00	12 57	20.00	13 44	20.00	16 106	20.00	19 124	20.00	21 142	20.00	23 160	20.00	25 178
19.00	14 60	19.00	16 91	19.00	18 110	19.00	21 134	19.00	23 152	19.00	25 170	19.00	27 188
18.00	17 84	18.00	18 96	18.00	21 114	18.00	24 138	18.00	26 154	18.00	28 172	18.00	30 190
17.00	19 59	17.00	20 101	17.00	23 118	17.00	26 142	17.00	28 160	17.00	30 178	17.00	32 196
16.00	21 75	16.00	22 107	16.00	25 122	16.00	28 146	16.00	30 164	16.00	32 182	16.00	34 202
15.00	23 83	15.00	24 112	15.00	27 126	15.00	30 150	15.00	32 170	15.00	34 188	15.00	36 208
14.00	25 93	14.00	26 117	14.00	29 130	14.00	32 154	14.00	34 174	14.00	36 192	14.00	38 214
13.00	27 106	13.00	28 122	13.00	31 134	13.00	34 158	13.00	36 178	13.00	38 196	13.00	40 220
12.00	29 123	12.00	30 127	12.00	33 138	12.00	36 162	12.00	38 182	12.00	40 200	12.00	42 226
11.00	31 147	11.00	32 131	11.00	35 142	11.00	38 166	11.00	40 186	11.00	42 204	11.00	44 232
10.00	33 220	10.00	34 135	10.00	37 146	10.00	40 170	10.00	42 190	10.00	44 208	10.00	46 238
9.00	35 246	9.00	36 139	9.00	39 150	9.00	42 174	9.00	44 194	9.00	46 212	9.00	48 244
8.00	37 250	8.00	38 143	8.00	41 154	8.00	44 178	8.00	46 198	8.00	48 216	8.00	50 250
7.00	39 265	7.00	40 147	7.00	43 158	7.00	46 182	7.00	48 202	7.00	50 220	7.00	52 256
6.00	41 271	6.00	42 151	6.00	45 162	6.00	48 186	6.00	50 206	6.00	52 224	6.00	54 262
5.00	43 279	5.00	44 155	5.00	47 166	5.00	50 190	5.00	52 210	5.00	54 228	5.00	56 268
4.00	45 288	4.00	46 159	4.00	49 170	4.00	52 194	4.00	54 214	4.00	56 232	4.00	58 274
3.00	47 300	3.00	48 163	3.00	51 174	3.00	54 198	3.00	56 218	3.00	58 236	3.00	60 280
2.00	49 317	2.00	50 167	2.00	53 178	2.00	56 202	2.00	58 222	2.00	60 240	2.00	62 286
1.00	51 346	1.00	52 171	1.00	55 182	1.00	58 206	1.00	60 226	1.00	62 244	1.00	64 292
0.00	53 369	0.00	54 175	0.00	57 186	0.00	60 210	0.00	62 230	0.00	64 248	0.00	66 298
9.77	E	9.77	E	9.77	E	9.77	E	9.77	E	9.77	E	9.77	E

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -20.00 LONG. = 90.00	GEOGRAPHIC LAT. = -20.00 LONG. = 105.00	GEOGRAPHIC LAT. = -20.00 LONG. = 120.00	GEOGRAPHIC LAT. = -20.00 LONG. = 135.00	GEOGRAPHIC LAT. = -20.00 LONG. = 150.00	GEOGRAPHIC LAT. = -20.00 LONG. = 165.00	GEOGRAPHIC LAT. = -20.00 LONG. = 180.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 21 161	23.00 14 100	20.00 17 199	20.00 14 217	20.00 10 239	20.00 7 254	20.00 7 254
20.00 22 166	13.00 21 185	19.00 19 204	19.00 16 222	19.00 12 240	19.00 9 253	19.00 9 253
10.00 24 172	15.00 21 191	16.00 20 210	16.00 17 228	16.00 13 247	16.00 10 267	16.00 10 267
17.00 25 179	17.00 24 199	17.00 21 218	17.00 18 236	17.00 14 255	17.00 11 273	17.00 11 273
16.00 25 187	15.00 23 206	16.00 20 227	16.00 17 245	16.00 13 264	16.00 9 284	16.00 9 284
15.00 23 187	15.00 20 210	15.00 17 237	15.00 13 256	15.00 9 276	15.00 5 300	15.00 5 300
14.00 18 200	14.00 18 210	14.00 9 250	14.00 5 263	14.00 0 291	14.00 -7 320	14.00 -7 320
13.00 17 223	13.00 8 244	13.00 -6 265	13.00 -11 283	13.00 -18 313	13.00 -25 322	13.00 -25 322
12.00 -13 262	11.00 -23 260	12.00 -30 295	12.00 -13 288	12.00 -20 317	12.00 -28 325	12.00 -28 325
11.00 -16 243	11.00 -26 273	11.00 -33 302	12.00 -15 290	12.00 -27 321	12.00 -35 328	12.00 -35 328
10.00 -18 249	11.00 -28 278	11.00 -32 309	12.00 -18 293	12.00 -24 325	12.00 -32 331	12.00 -32 331
11.70 -21 252	11.70 -30 284	11.70 -32 310	12.00 -20 296	12.00 -26 316	12.00 -34 335	12.00 -34 335
11.00 -24 257	11.50 -31 291	11.50 -30 320	12.00 -22 299	12.00 -28 316	12.00 -36 338	12.00 -36 338
11.00 -26 262	11.50 -32 300	11.50 -35 340	12.00 -25 303	12.00 -30 343	12.00 -38 343	12.00 -38 343
11.40 -28 269	11.40 -30 311	11.40 -15 352	12.00 -27 307	12.00 -32 351	12.00 -40 358	12.00 -40 358
11.30 -29 277	11.30 -25 323	11.30 3 360	12.00 -29 312	12.00 -34 358	12.00 -42 361	12.00 -42 361
11.20 -30 286	11.20 -16 337	11.20 6 370	12.00 -31 318	12.00 -36 372	12.00 -44 364	12.00 -44 364
11.10 -30 298	11.10 2 356	11.10 6 373	12.00 -32 329	12.00 -37 381	12.00 -46 369	12.00 -46 369
11.00 -31 311	11.00 4 350	11.00 11 375	12.00 -33 339	12.00 -38 391	12.00 -48 372	12.00 -48 372
10.90 -31 324	11.00 7 361	11.00 18 378	12.00 -34 352	12.00 -39 401	12.00 -50 377	12.00 -50 377
10.80 -31 336	11.00 10 365	11.00 25 382	12.00 -35 362	12.00 -40 416	12.00 -52 380	12.00 -52 380
10.70 12 361	11.00 12 369	11.00 32 386	12.00 -36 372	12.00 -41 431	12.00 -54 383	12.00 -54 383
10.77 16 374	11.00 15 373	11.00 39 391	12.00 -37 386	12.00 -42 446	12.00 -56 386	12.00 -56 386
10.74 17 381	11.00 18 378	11.00 46 397	12.00 -38 399	12.00 -43 461	12.00 -58 389	12.00 -58 389
10.76 17 384	11.00 20 385	11.00 53 405	12.00 -39 416	12.00 -44 476	12.00 -60 392	12.00 -60 392
10.73 17 390	11.00 22 393	11.00 60 413	12.00 -40 431	12.00 -45 491	12.00 -62 395	12.00 -62 395
10.76 14 413	11.00 23 403	11.00 67 421	12.00 -41 446	12.00 -46 506	12.00 -64 398	12.00 -64 398
10.73 4 430	11.00 24 417	11.00 74 429	12.00 -42 461	12.00 -47 521	12.00 -66 401	12.00 -66 401
10.72 10 456	11.00 14 436	11.00 81 437	12.00 -43 476	12.00 -48 536	12.00 -68 404	12.00 -68 404
10.73 10 456	11.00 14 436	11.00 81 437	12.00 -43 476	12.00 -48 536	12.00 -68 404	12.00 -68 404
10.73 10 456	11.00 14 436	11.00 81 437	12.00 -43 476	12.00 -48 536	12.00 -68 404	12.00 -68 404
10.73 10 456	11.00 14 436	11.00 81 437	12.00 -43 476	12.00 -48 536	12.00 -68 404	12.00 -68 404

TABLE 41 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR MONO GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IPPOC 1975.0)

GEOGRAPHIC (GV) LAT. = -20.00 LONG. = 180.00	GEOGRAPHIC (GV) LAT. = -20.00 LONG. = 195.00	GEOGRAPHIC (GV) LAT. = -20.00 LONG. = 210.00	GEOGRAPHIC (GV) LAT. = -20.00 LONG. = 225.00	GEOGRAPHIC (GV) LAT. = -20.00 LONG. = 240.00	GEOGRAPHIC (GV) LAT. = -20.00 LONG. = 255.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 4 272	20.00 2 -71	20.00 0 -55	20.00 -2 -40	20.00 -3 -26	20.00 -3 -14
19.00 6 278	19.00 3 -64	19.00 2 -48	19.00 1 -38	19.00 0 -19	19.00 0 -7
18.00 7 286	18.00 5 -56	18.00 4 -40	18.00 3 -25	18.00 1 -11	18.00 3 0
17.00 8 296	17.00 7 -45	17.00 5 -29	17.00 5 -14	17.00 5 -1	17.00 7 10
16.00 6 308	16.00 7 -32	16.00 5 -14	16.00 7 1	16.00 8 11	16.00 10 23
15.00 1 326	15.00 1 -11	15.00 3 0	15.00 6 23	15.00 10 35	15.00 13 43
14.00 11 333	14.00 3 -9	14.00 2 11	14.00 6 26	14.00 10 38	14.00 13 45
13.00 13 337	13.00 -1 -6	13.00 1 14	13.00 5 30	13.00 10 41	13.00 13 48
12.00 -14 362	12.00 -2 -3	12.00 1 17	12.00 5 33	12.00 10 44	12.00 13 51
11.00 -16 368	11.00 -3 0	11.00 0 21	11.00 5 37	11.00 9 48	11.00 13 54
10.00 -17 374	10.00 -4 3	10.00 -1 24	10.00 4 41	10.00 9 52	10.00 13 58
9.00 -17 381	9.00 -5 7	9.00 -2 29	9.00 4 46	9.00 9 56	9.00 13 62
8.00 -17 389	8.00 -6 11	8.00 -2 33	8.00 3 51	8.00 8 61	8.00 13 66
7.00 -15 399	7.00 -7 15	7.00 -3 39	7.00 2 56	7.00 8 67	7.00 13 70
6.00 -10 410	6.00 -8 20	6.00 -4 45	6.00 2 61	6.00 7 73	6.00 12 75
5.00 20 445	5.00 -10 26	5.00 -4 52	5.00 2 71	5.00 7 80	5.00 12 80
4.00 9 517	4.00 -11 32	4.00 -4 60	4.00 2 80	4.00 6 88	4.00 11 87
3.00 11 523	3.00 -11 40	3.00 -4 70	3.00 2 92	3.00 5 99	3.00 10 96
2.00 -21 577	2.00 -10 48	2.00 -3 84	2.00 4 110	2.00 4 113	2.00 8 103
1.00 -10 595	1.00 -7 59	1.00 -2 88	1.00 6 140	1.00 3 135	1.00 6 133
0.00 17 592	0.00 -2 72	0.00 7 187	0.00 8 144	0.00 3 138	0.00 6 124
-1.00 4 499	-1.00 10 91	-1.00 17 147	-1.00 9 144	-1.00 3 138	-1.00 6 124
-2.00 13 506	-2.00 25 132	-2.00 33 185	-2.00 10 156	-2.00 3 141	-2.00 6 124
-3.00 18 512	-3.00 25 141	-3.00 41 195	-3.00 10 163	-3.00 3 144	-3.00 6 124
-4.00 20 518	-4.00 25 151	-4.00 48 204	-4.00 10 172	-4.00 3 148	-4.00 6 124
-5.00 21 524	-5.00 25 162	-5.00 55 214	-5.00 9 182	-5.00 3 152	-5.00 6 124
-6.00 21 530	-6.00 25 176	-6.00 62 224	-6.00 8 197	-6.00 3 157	-6.00 6 124
-7.00 21 536	-7.00 25 196	-7.00 70 234	-7.00 7 219	-7.00 3 162	-7.00 6 124
-8.00 21 542	-8.00 25 216	-8.00 78 244	-8.00 6 246	-8.00 3 167	-8.00 6 124
-9.00 21 548	-9.00 25 236	-9.00 86 254	-9.00 5 276	-9.00 3 172	-9.00 6 124
-10.00 21 554	-10.00 25 256	-10.00 94 264	-10.00 4 306	-10.00 3 177	-10.00 6 124
-11.00 21 560	-11.00 25 276	-11.00 102 274	-11.00 3 336	-11.00 3 182	-11.00 6 124
-12.00 21 566	-12.00 25 296	-12.00 110 284	-12.00 2 366	-12.00 3 187	-12.00 6 124
-13.00 21 572	-13.00 25 316	-13.00 118 294	-13.00 1 396	-13.00 3 192	-13.00 6 124
-14.00 21 578	-14.00 25 336	-14.00 126 304	-14.00 0 426	-14.00 3 197	-14.00 6 124
-15.00 21 584	-15.00 25 356	-15.00 134 314	-15.00 -1 456	-15.00 3 202	-15.00 6 124
-16.00 21 590	-16.00 25 376	-16.00 142 324	-16.00 -2 486	-16.00 3 207	-16.00 6 124
-17.00 21 596	-17.00 25 396	-17.00 150 334	-17.00 -3 516	-17.00 3 212	-17.00 6 124
-18.00 21 602	-18.00 25 416	-18.00 158 344	-18.00 -4 546	-18.00 3 217	-18.00 6 124
-19.00 21 608	-19.00 25 436	-19.00 166 354	-19.00 -5 576	-19.00 3 222	-19.00 6 124
-20.00 21 614	-20.00 25 456	-20.00 174 364	-20.00 -6 606	-20.00 3 227	-20.00 6 124

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR MONO GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOMAGNETIC (GV) LAT LONG	GEOMAGNETIC LAT. = -20.00 LONG. = 265.00	GEOMAGNETIC LAT. = -20.00 LONG. = 300.00	GEOMAGNETIC LAT. = -20.00 LONG. = 315.00	GEOMAGNETIC LAT. = -20.00 LONG. = 330.00	GEOMAGNETIC LAT. = -20.00 LONG. = 345.00
20.00 -2 -3	20.00 1 7	20.00 5 17	20.00 10 26	20.00 12 34	20.00 13 44
19.00 1 3	19.00 1 13	19.00 7 22	19.00 12 30	19.00 14 39	19.00 15 48
18.00 4 10	18.00 5 19	18.00 10 28	18.00 14 36	18.00 16 44	18.00 17 53
17.00 7 19	17.00 8 27	17.00 12 35	17.00 16 43	17.00 18 50	17.00 19 58
16.00 11 31	16.00 12 38	16.00 15 45	16.00 18 52	16.00 20 58	16.00 21 65
15.00 15 46	15.00 17 52	15.00 19 58	15.00 19 64	15.00 22 00	15.00 23 73
14.00 19 58	14.00 17 75	14.00 17 79	14.00 19 80	14.00 21 81	14.00 24 84
13.00 15 00	13.00 17 79	13.00 17 80	13.00 19 80	13.00 21 80	13.00 22 99
12.00 10 07	12.00 17 82	12.00 17 82	12.00 19 80	12.00 21 80	12.00 23 13
11.00 14 02	11.00 17 85	11.00 17 85	11.00 19 80	11.00 21 80	11.00 23 13
10.00 13 08	10.00 17 89	10.00 17 89	10.00 19 80	10.00 21 80	10.00 23 13
9.00 11 105	9.00 17 94	9.00 17 94	9.00 19 80	9.00 21 80	9.00 23 13
8.00 9 113	8.00 17 98	8.00 17 98	8.00 19 80	8.00 21 80	8.00 23 13
7.00 6 123	7.00 17 101	7.00 17 101	7.00 19 80	7.00 21 80	7.00 23 13
6.00 3 136	6.00 17 104	6.00 17 104	6.00 19 80	6.00 21 80	6.00 23 13
5.00 -3 158	5.00 17 106	5.00 17 106	5.00 19 80	5.00 21 80	5.00 23 13
4.00 -9 195	4.00 17 109	4.00 17 109	4.00 19 80	4.00 21 80	4.00 23 13
3.00 -14 202	3.00 17 113	3.00 17 113	3.00 19 80	3.00 21 80	3.00 23 13
2.00 -19 211	2.00 17 116	2.00 17 116	2.00 19 80	2.00 21 80	2.00 23 13
1.00 -24 223	1.00 17 119	1.00 17 119	1.00 19 80	1.00 21 80	1.00 23 13
0.00 -29 239	0.00 17 122	0.00 17 122	0.00 19 80	0.00 21 80	0.00 23 13
-1.00 -34 268	-1.00 17 125	-1.00 17 125	-1.00 19 80	-1.00 21 80	-1.00 23 13
-2.00 -39 295	-2.00 17 128	-2.00 17 128	-2.00 19 80	-2.00 21 80	-2.00 23 13
-3.00 -44 322	-3.00 17 131	-3.00 17 131	-3.00 19 80	-3.00 21 80	-3.00 23 13
-4.00 -49 349	-4.00 17 134	-4.00 17 134	-4.00 19 80	-4.00 21 80	-4.00 23 13
-5.00 -54 376	-5.00 17 137	-5.00 17 137	-5.00 19 80	-5.00 21 80	-5.00 23 13
-6.00 -59 403	-6.00 17 140	-6.00 17 140	-6.00 19 80	-6.00 21 80	-6.00 23 13
-7.00 -64 430	-7.00 17 143	-7.00 17 143	-7.00 19 80	-7.00 21 80	-7.00 23 13
-8.00 -69 457	-8.00 17 146	-8.00 17 146	-8.00 19 80	-8.00 21 80	-8.00 23 13
-9.00 -74 484	-9.00 17 149	-9.00 17 149	-9.00 19 80	-9.00 21 80	-9.00 23 13
-10.00 -79 511	-10.00 17 152	-10.00 17 152	-10.00 19 80	-10.00 21 80	-10.00 23 13
-11.00 -84 538	-11.00 17 155	-11.00 17 155	-11.00 19 80	-11.00 21 80	-11.00 23 13
-12.00 -89 565	-12.00 17 158	-12.00 17 158	-12.00 19 80	-12.00 21 80	-12.00 23 13
-13.00 -94 592	-13.00 17 161	-13.00 17 161	-13.00 19 80	-13.00 21 80	-13.00 23 13
-14.00 -99 619	-14.00 17 164	-14.00 17 164	-14.00 19 80	-14.00 21 80	-14.00 23 13
-15.00 -104 646	-15.00 17 167	-15.00 17 167	-15.00 19 80	-15.00 21 80	-15.00 23 13
-16.00 -109 673	-16.00 17 170	-16.00 17 170	-16.00 19 80	-16.00 21 80	-16.00 23 13
-17.00 -114 700	-17.00 17 173	-17.00 17 173	-17.00 19 80	-17.00 21 80	-17.00 23 13
-18.00 -119 727	-18.00 17 176	-18.00 17 176	-18.00 19 80	-18.00 21 80	-18.00 23 13
-19.00 -124 754	-19.00 17 179	-19.00 17 179	-19.00 19 80	-19.00 21 80	-19.00 23 13
-20.00 -129 781	-20.00 17 182	-20.00 17 182	-20.00 19 80	-20.00 21 80	-20.00 23 13
-21.00 -134 808	-21.00 17 185	-21.00 17 185	-21.00 19 80	-21.00 21 80	-21.00 23 13
-22.00 -139 835	-22.00 17 188	-22.00 17 188	-22.00 19 80	-22.00 21 80	-22.00 23 13
-23.00 -144 862	-23.00 17 191	-23.00 17 191	-23.00 19 80	-23.00 21 80	-23.00 23 13
-24.00 -149 889	-24.00 17 194	-24.00 17 194	-24.00 19 80	-24.00 21 80	-24.00 23 13
-25.00 -154 916	-25.00 17 197	-25.00 17 197	-25.00 19 80	-25.00 21 80	-25.00 23 13
-26.00 -159 943	-26.00 17 200	-26.00 17 200	-26.00 19 80	-26.00 21 80	-26.00 23 13
-27.00 -164 970	-27.00 17 203	-27.00 17 203	-27.00 19 80	-27.00 21 80	-27.00 23 13
-28.00 -169 997	-28.00 17 206	-28.00 17 206	-28.00 19 80	-28.00 21 80	-28.00 23 13
-29.00 -174 1024	-29.00 17 209	-29.00 17 209	-29.00 19 80	-29.00 21 80	-29.00 23 13
-30.00 -179 1051	-30.00 17 212	-30.00 17 212	-30.00 19 80	-30.00 21 80	-30.00 23 13
-31.00 -184 1078	-31.00 17 215	-31.00 17 215	-31.00 19 80	-31.00 21 80	-31.00 23 13
-32.00 -189 1105	-32.00 17 218	-32.00 17 218	-32.00 19 80	-32.00 21 80	-32.00 23 13
-33.00 -194 1132	-33.00 17 221	-33.00 17 221	-33.00 19 80	-33.00 21 80	-33.00 23 13
-34.00 -199 1159	-34.00 17 224	-34.00 17 224	-34.00 19 80	-34.00 21 80	-34.00 23 13
-35.00 -204 1186	-35.00 17 227	-35.00 17 227	-35.00 19 80	-35.00 21 80	-35.00 23 13
-36.00 -209 1213	-36.00 17 230	-36.00 17 230	-36.00 19 80	-36.00 21 80	-36.00 23 13
-37.00 -214 1240	-37.00 17 233	-37.00 17 233	-37.00 19 80	-37.00 21 80	-37.00 23 13
-38.00 -219 1267	-38.00 17 236	-38.00 17 236	-38.00 19 80	-38.00 21 80	-38.00 23 13
-39.00 -224 1294	-39.00 17 239	-39.00 17 239	-39.00 19 80	-39.00 21 80	-39.00 23 13
-40.00 -229 1321	-40.00 17 242	-40.00 17 242	-40.00 19 80	-40.00 21 80	-40.00 23 13
-41.00 -234 1348	-41.00 17 245	-41.00 17 245	-41.00 19 80	-41.00 21 80	-41.00 23 13
-42.00 -239 1375	-42.00 17 248	-42.00 17 248	-42.00 19 80	-42.00 21 80	-42.00 23 13
-43.00 -244 1402	-43.00 17 251	-43.00 17 251	-43.00 19 80	-43.00 21 80	-43.00 23 13
-44.00 -249 1429	-44.00 17 254	-44.00 17 254	-44.00 19 80	-44.00 21 80	-44.00 23 13
-45.00 -254 1456	-45.00 17 257	-45.00 17 257	-45.00 19 80	-45.00 21 80	-45.00 23 13
-46.00 -259 1483	-46.00 17 260	-46.00 17 260	-46.00 19 80	-46.00 21 80	-46.00 23 13
-47.00 -264 1510	-47.00 17 263	-47.00 17 263	-47.00 19 80	-47.00 21 80	-47.00 23 13
-48.00 -269 1537	-48.00 17 266	-48.00 17 266	-48.00 19 80	-48.00 21 80	-48.00 23 13
-49.00 -274 1564	-49.00 17 269	-49.00 17 269	-49.00 19 80	-49.00 21 80	-49.00 23 13
-50.00 -279 1591	-50.00 17 272	-50.00 17 272	-50.00 19 80	-50.00 21 80	-50.00 23 13
-51.00 -284 1618	-51.00 17 275	-51.00 17 275	-51.00 19 80	-51.00 21 80	-51.00 23 13
-52.00 -289 1645	-52.00 17 278	-52.00 17 278	-52.00 19 80	-52.00 21 80	-52.00 23 13
-53.00 -294 1672	-53.00 17 281	-53.00 17 281	-53.00 19 80	-53.00 21 80	-53.00 23 13
-54.00 -299 1699	-54.00 17 284	-54.00 17 284	-54.00 19 80	-54.00 21 80	-54.00 23 13
-55.00 -304 1726	-55.00 17 287	-55.00 17 287	-55.00 19 80	-55.00 21 80	-55.00 23 13
-56.00 -309 1753	-56.00 17 290	-56.00 17 290	-56.00 19 80	-56.00 21 80	-56.00 23 13
-57.00 -314 1780	-57.00 17 293	-57.00 17 293	-57.00 19 80	-57.00 21 80	-57.00 23 13
-58.00 -319 1807	-58.00 17 296	-58.00 17 296	-58.00 19 80	-58.00 21 80	-58.00 23 13
-59.00 -324 1834	-59.00 17 299	-59.00 17 299	-59.00 19 80	-59.00 21 80	-59.00 23 13
-60.00 -329 1861	-60.00 17 302	-60.00 17 302	-60.00 19 80	-60.00 21 80	-60.00 23 13
-61.00 -334 1888	-61.00 17 305	-61.00 17 305	-61.00 19 80	-61.00 21 80	-61.00 23 13
-62.00 -339 1915	-62.00 17 308	-62.00 17 308	-62.00 19 80	-62.00 21 80	-62.00 23 13
-63.00 -344 1942	-63.00 17 311	-63.00 17 311	-63.00 19 80	-63.00 21 80	-63.00 23 13
-64.00 -349 1969	-64.00 17 314	-64.00 17 314	-64.00 19 80	-64.00 21 80	-64.00 23 13
-65.00 -354 1996	-65.00 17 317	-65.00 17 317	-65.00 19 80	-65.00 21 80	-65.00 23 13
-66.00 -359 2023	-66.00 17 320	-66.00 17 320	-66.00 19 80	-66.00 21 80	-66.00 23 13
-67.00 -364 2050	-67.00 17 323	-67.00 17 323	-67.00 19 80	-67.00 21 80	-67.00 23 13
-68.00 -369 2077	-68.00 17 326	-68.00 17 326	-68.00 19 80	-68.00 21 80	-68.00 23 13
-69.00 -374 2104	-69.00 17 329	-69.00 17 329	-69.00 19 80	-69.00 21 80	-69.00 23 13
-70.00 -379 2131	-70.00 17 332	-70.00 17 332	-70.00 19 80	-70.00 21 80	-70.00 23 13
-71.00 -384 2158	-71.00 17 335	-71.00 17 335	-71.00 19 80	-71.00 21 80	-71.00 23 13
-72.00 -389 2185	-72.00 17 338	-72.00 17 338	-72.00 19 80	-72.00 21 80	-72.00 23 13
-73.00 -394 2212	-73.00 17 341	-73.00 17 341	-73.00 19 80	-73.00 21 80	-73.00 23 13
-74.00 -399 2239	-74.00 17 344	-74.00 17 344	-74.00 19 80	-74.00 21 80	-74.00 23 13
-75.00 -404 2266	-75.00 17 347	-75.00 17 347	-75.00 19 80	-75.00 21 80	-75.00 23 13
-76.00 -409 2293	-76.00 17 350	-76.00 17 350	-76.00 19 80	-76.00 21 80	-76.00 23 13
-77.00 -414 2320	-77.00 17 353	-77.00 17 353	-77.00 19 80	-77.00 21 80	-77.00 23 13
-78.00 -419 2347	-78.00 17 356	-78.00 17 356	-78.00 19 80	-78.00 21 80	-78.00 23 13
-79.00 -424 2374	-79.00 17 359	-79.00 17 359	-79.00 19 80	-79.00 21 80	-79.00 23 13
-80.00 -429 2401	-80.00 17 362	-80.00 17 362	-80.00 19 80	-80.00 21 80	-80.00 23 13
-81.00 -434 2428	-81.00 17 365	-81.00 17 365	-81.00 19 80	-81.00 21 80	-81.00 23 13
-82.00 -439 2455	-82.00 17 368	-82.00 17 368	-82.00 19 80	-82.00 21 80	-82.00 23 13
-83.00 -444 2482	-83.00 17 371	-83.00 17 371	-83.00 19 80	-83.00 21 80	-83.00 23 13
-84.00 -449 2509	-84.00 17 374	-84.00 17 374	-84.00 19 80	-84.00 21 80	-84.00 23 13
-85.00 -454 2536	-85.00 17 377	-85.00 17 377	-85.00 19 80	-85.00 21 80	-85.00 23 13
-86.00 -459 2563	-86.00 17 380	-86.00 17 380	-86.00 19 80	-86.00 21 80	-86.00 23 13
-87.00 -464 2590	-87.00 17 383	-87.00 17 383	-87.00 19 80	-87.00 21 80	-87.00 23 13
-88.00 -469 2617	-88.00 17 386	-88.00 17 386	-88.00 19 80	-88.00 21 80	-88.00 23 13
-89.00 -474 2644	-89.00 17 389	-89.00 17 389	-89.00 19 80	-89.00 21 80	-89.00 23 13
-90.00 -479 2671	-90.00 17 392	-90.00 17 392	-90.00 19 80	-90.00 21 80	-90.00 23 13
-91.00 -484 2698	-91.00 17 395	-91.00 17 395	-91.00 19 80	-91.00 21 80	-91.00 23 13
-92.00 -489 2725	-92.00 17 398	-92.00 17 398	-92.00 19 80	-92.00 21 80	-92.00 23 13
-93.00 -494 2752	-93.00 17 401	-93.00 17 401	-93.00 19 80	-93.00 21 80	-93.00 23 13
-94.00 -499 2779	-94.00 17 404	-94.00 17 404	-94.00 19 80	-94.00 21 80	-94.00 23 13
-95.00 -504 2806	-95.				

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (POD 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = -25.00 LONG. = 0.00		LAT. = -25.00 LONG. = 15.00		LAT. = -25.00 LONG. = 30.00		LAT. = -25.00 LONG. = 45.00		LAT. = -25.00 LONG. = 60.00	
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 9 50	21.00 3 64	20.00 10 80	20.00 13 96	20.00 14 111	20.00 16 127	20.00 18 143	20.00 20 159	20.00 22 175	20.00 24 191
19.00 11 53	19.00 11 67	19.00 12 82	19.00 15 98	19.00 16 113	19.00 18 129	19.00 20 145	19.00 22 161	19.00 24 177	19.00 26 193
18.00 13 56	18.00 13 69	18.00 14 85	18.00 17 101	18.00 18 116	18.00 20 132	18.00 22 148	18.00 24 164	18.00 26 180	18.00 28 196
17.00 15 59	17.00 15 73	17.00 16 89	17.00 19 106	17.00 20 121	17.00 22 137	17.00 24 153	17.00 26 169	17.00 28 185	17.00 30 201
16.00 17 44	16.00 17 77	16.00 20 93	16.00 23 111	16.00 24 126	16.00 26 142	16.00 28 158	16.00 30 174	16.00 32 190	16.00 34 206
15.00 19 22	15.00 19 82	15.00 21 98	15.00 24 116	15.00 26 132	15.00 28 148	15.00 30 164	15.00 32 180	15.00 34 196	15.00 36 212
14.00 21 76	14.00 21 89	14.00 23 105	14.00 26 124	14.00 28 140	14.00 30 156	14.00 32 172	14.00 34 188	14.00 36 204	14.00 38 220
13.00 23 46	13.00 23 97	13.00 25 114	13.00 28 134	13.00 30 150	13.00 32 166	13.00 34 182	13.00 36 198	13.00 38 214	13.00 40 230
12.00 26 08	12.00 26 109	12.00 28 126	12.00 31 146	12.00 33 162	12.00 35 178	12.00 37 194	12.00 39 210	12.00 41 226	12.00 43 242
11.00 28 115	11.00 28 124	11.00 30 142	11.00 33 162	11.00 35 178	11.00 37 194	11.00 39 210	11.00 41 226	11.00 43 242	11.00 45 258
10.00 30 137	10.00 30 146	10.00 32 160	10.00 35 180	10.00 37 196	10.00 39 212	10.00 41 228	10.00 43 244	10.00 45 260	10.00 47 276
9.00 32 162	9.00 32 171	9.00 34 185	9.00 37 201	9.00 39 217	9.00 41 233	9.00 43 249	9.00 45 265	9.00 47 281	9.00 49 297
8.00 34 187	8.00 34 196	8.00 36 209	8.00 39 226	8.00 41 242	8.00 43 258	8.00 45 274	8.00 47 290	8.00 49 306	8.00 51 322
7.00 36 212	7.00 36 221	7.00 38 233	7.00 41 250	7.00 43 266	7.00 45 282	7.00 47 298	7.00 49 314	7.00 51 330	7.00 53 346
6.00 38 237	6.00 38 246	6.00 40 255	6.00 43 272	6.00 45 288	6.00 47 304	6.00 49 320	6.00 51 336	6.00 53 352	6.00 55 368
5.00 40 262	5.00 40 271	5.00 42 287	5.00 45 304	5.00 47 320	5.00 49 336	5.00 51 352	5.00 53 368	5.00 55 384	5.00 57 400
4.00 42 287	4.00 42 296	4.00 44 309	4.00 47 326	4.00 49 342	4.00 51 358	4.00 53 374	4.00 55 390	4.00 57 406	4.00 59 422
3.00 44 312	3.00 44 321	3.00 46 323	3.00 49 340	3.00 51 356	3.00 53 372	3.00 55 388	3.00 57 404	3.00 59 420	3.00 61 436
2.00 46 337	2.00 46 346	2.00 48 335	2.00 51 352	2.00 53 368	2.00 55 384	2.00 57 400	2.00 59 416	2.00 61 432	2.00 63 448
1.00 48 362	1.00 48 371	1.00 50 357	1.00 53 374	1.00 55 390	1.00 57 406	1.00 59 422	1.00 61 438	1.00 63 454	1.00 65 470
0.00 50 387	0.00 50 396	0.00 52 381	0.00 55 400	0.00 57 416	0.00 59 432	0.00 61 448	0.00 63 464	0.00 65 480	0.00 67 496
-1.00 52 412	-1.00 52 421	-1.00 54 405	-1.00 57 422	-1.00 59 438	-1.00 61 454	-1.00 63 470	-1.00 65 486	-1.00 67 502	-1.00 69 518
-2.00 54 437	-2.00 54 446	-2.00 56 419	-2.00 59 440	-2.00 61 456	-2.00 63 472	-2.00 65 488	-2.00 67 504	-2.00 69 520	-2.00 71 536
-3.00 56 462	-3.00 56 471	-3.00 58 444	-3.00 61 465	-3.00 63 481	-3.00 65 497	-3.00 67 513	-3.00 69 529	-3.00 71 545	-3.00 73 561
-4.00 58 487	-4.00 58 496	-4.00 60 469	-4.00 63 490	-4.00 65 506	-4.00 67 522	-4.00 69 538	-4.00 71 554	-4.00 73 570	-4.00 75 586
-5.00 60 512	-5.00 60 521	-5.00 62 494	-5.00 65 515	-5.00 67 531	-5.00 69 547	-5.00 71 563	-5.00 73 579	-5.00 75 595	-5.00 77 611
-6.00 62 537	-6.00 62 546	-6.00 64 519	-6.00 67 540	-6.00 69 556	-6.00 71 572	-6.00 73 588	-6.00 75 604	-6.00 77 620	-6.00 79 636
-7.00 64 562	-7.00 64 571	-7.00 66 544	-7.00 69 565	-7.00 71 581	-7.00 73 597	-7.00 75 613	-7.00 77 629	-7.00 79 645	-7.00 81 661
-8.00 66 587	-8.00 66 596	-8.00 68 569	-8.00 71 590	-8.00 73 606	-8.00 75 622	-8.00 77 638	-8.00 79 654	-8.00 81 670	-8.00 83 686
-9.00 68 612	-9.00 68 621	-9.00 70 594	-9.00 73 615	-9.00 75 631	-9.00 77 647	-9.00 79 663	-9.00 81 679	-9.00 83 695	-9.00 85 711
-10.00 70 637	-10.00 70 646	-10.00 72 619	-10.00 75 640	-10.00 77 656	-10.00 79 672	-10.00 81 688	-10.00 83 704	-10.00 85 720	-10.00 87 736
-11.00 72 662	-11.00 72 671	-11.00 74 644	-11.00 77 665	-11.00 79 681	-11.00 81 697	-11.00 83 713	-11.00 85 729	-11.00 87 745	-11.00 89 761
-12.00 74 687	-12.00 74 696	-12.00 76 669	-12.00 79 690	-12.00 81 706	-12.00 83 722	-12.00 85 738	-12.00 87 754	-12.00 89 770	-12.00 91 786
-13.00 76 712	-13.00 76 721	-13.00 78 694	-13.00 81 715	-13.00 83 731	-13.00 85 747	-13.00 87 763	-13.00 89 779	-13.00 91 795	-13.00 93 811
-14.00 78 737	-14.00 78 746	-14.00 80 719	-14.00 83 740	-14.00 85 756	-14.00 87 772	-14.00 89 788	-14.00 91 804	-14.00 93 820	-14.00 95 836
-15.00 80 762	-15.00 80 771	-15.00 82 744	-15.00 85 765	-15.00 87 781	-15.00 89 797	-15.00 91 813	-15.00 93 829	-15.00 95 845	-15.00 97 861
-16.00 82 787	-16.00 82 796	-16.00 84 769	-16.00 87 790	-16.00 89 806	-16.00 91 822	-16.00 93 838	-16.00 95 854	-16.00 97 870	-16.00 99 886
-17.00 84 812	-17.00 84 821	-17.00 86 794	-17.00 89 815	-17.00 91 831	-17.00 93 847	-17.00 95 863	-17.00 97 879	-17.00 99 895	-17.00 101 911
-18.00 86 837	-18.00 86 846	-18.00 88 819	-18.00 91 840	-18.00 93 856	-18.00 95 872	-18.00 97 888	-18.00 99 904	-18.00 101 920	-18.00 103 936
-19.00 88 862	-19.00 88 871	-19.00 90 844	-19.00 93 865	-19.00 95 881	-19.00 97 897	-19.00 99 913	-19.00 101 929	-19.00 103 945	-19.00 105 961
-20.00 90 887	-20.00 90 896	-20.00 92 869	-20.00 95 890	-20.00 97 906	-20.00 99 922	-20.00 101 938	-20.00 103 954	-20.00 105 970	-20.00 107 986
-21.00 92 912	-21.00 92 921	-21.00 94 894	-21.00 97 915	-21.00 99 931	-21.00 101 947	-21.00 103 963	-21.00 105 979	-21.00 107 995	-21.00 109 1011
-22.00 94 937	-22.00 94 946	-22.00 96 919	-22.00 99 940	-22.00 101 956	-22.00 103 972	-22.00 105 988	-22.00 107 1004	-22.00 109 1020	-22.00 111 1036
-23.00 96 962	-23.00 96 971	-23.00 98 944	-23.00 101 965	-23.00 103 981	-23.00 105 997	-23.00 107 1013	-23.00 109 1029	-23.00 111 1045	-23.00 113 1061
-24.00 98 987	-24.00 98 996	-24.00 100 969	-24.00 103 990	-24.00 105 1006	-24.00 107 1022	-24.00 109 1038	-24.00 111 1054	-24.00 113 1070	-24.00 115 1086
-25.00 100 1012	-25.00 100 1021	-25.00 102 994	-25.00 105 1015	-25.00 107 1031	-25.00 109 1047	-25.00 111 1063	-25.00 113 1079	-25.00 115 1095	-25.00 117 1111
-26.00 102 1037	-26.00 102 1046	-26.00 104 1019	-26.00 107 1040	-26.00 109 1056	-26.00 111 1072	-26.00 113 1088	-26.00 115 1104	-26.00 117 1120	-26.00 119 1136
-27.00 104 1062	-27.00 104 1071	-27.00 106 1044	-27.00 109 1065	-27.00 111 1081	-27.00 113 1097	-27.00 115 1113	-27.00 117 1129	-27.00 119 1145	-27.00 121 1161
-28.00 106 1087	-28.00 106 1096	-28.00 108 1069	-28.00 111 1090	-28.00 113 1106	-28.00 115 1122	-28.00 117 1138	-28.00 119 1154	-28.00 121 1170	-28.00 123 1186
-29.00 108 1112	-29.00 108 1121	-29.00 110 1094	-29.00 113 1115	-29.00 115 1131	-29.00 117 1147	-29.00 119 1163	-29.00 121 1179	-29.00 123 1195	-29.00 125 1211
-30.00 110 1137	-30.00 110 1146	-30.00 112 1119	-30.00 115 1130	-30.00 117 1146	-30.00 119 1162	-30.00 121 1178	-30.00 123 1194	-30.00 125 1210	-30.00 127 1226
-31.00 112 1162	-31.00 112 1171	-31.00 114 1144	-31.00 117 1155	-31.00 119 1171	-31.00 121 1187	-31.00 123 1203	-31.00 125 1219	-31.00 127 1235	-31.00 129 1251
-32.00 114 1187	-32.00 114 1196	-32.00 116 1169	-32.00 119 1180	-32.00 121 1196	-32.00 123 1212	-32.00 125 1228	-32.00 127 1244	-32.00 129 1260	-32.00 131 1276
-33.00 116 1212	-33.00 116 1221	-33.00 118 1194	-33.00 121 1205	-33.00 123 1221	-33.00 125 1237	-33.00 127 1253	-33.00 129 1269	-33.00 131 1285	-33.00 133 1301
-34.00 118 1237	-34.00 118 1246	-34.00 120 1219	-34.00 123 1230	-34.00 125 1246	-34.00 127 1262	-34.00 129 1278	-34.00 131 1294	-34.00 133 1310	-34.00 135 1326
-35.00 120 1262	-35.00 120 1271	-35.00 122 1244	-35.00 125 1255	-35.00 127 1271	-35.00 129 1287	-35.00 131 1303	-35.00 133 1319	-35.00 135 1335	-35.00 137 1351
-36.00 122 1287	-36.00 122 1296	-36.00 124 1269	-36.00 127 1280	-36.00 129 1296	-36.00 131 1312	-36.00 133 1328	-36.00 135 1344	-36.00 137 1360	-36.00 139 1376
-37.00 124 1312	-37.00 124 1321	-37.00 126 1294	-37.00 129 1305	-37.00 131 1321	-37.00 133 1337	-37.00 135 1353	-37.00 137 1369	-37.00 139 1385	-37.00 141 1401
-38.00 126 1337	-38.00 126 1346	-38.00 128 1319	-38.00 131 1330	-38.00 133 1346	-38.00 135 1362	-38.00 137 1378	-38.00 139 1394	-38.00 141 1410	-38.00 143 1426
-39.00 128 1362	-39.00 128 1371	-39.00 130 1344	-39.00 133 1355	-39.00 135 1371	-39.00 137 1387	-39.00 139 1403	-39.00 141 1419	-39.00 143 1435	-39.00 145 1451
-40.00 130 1387	-40.00 130 1396	-40.00 132 1369	-40.00 135 1380	-40.00 137 1396	-40.00 139 1412	-40.00 141 1428	-40.00 143 1444	-40.00 145 1460	-40.00 147 1476
-41.00 132 1412	-41.00 132 1421	-41.00 134 1394	-41.00 137 1405	-41.00 139 1421	-41.00 141 1437	-41.00 143 1453	-41.00 145 1469	-41.00 147 1485	-41.00 149 1501
-42.00 134 1437	-42.00 134 1446	-42.00 136 1419	-42.00 139 1430	-42.00 141 1446	-42.00 143 1462	-42.00 145 1478	-42.00 147 1494	-42.00 149 1510	-42.00 151 1526
-43.00 136 1462	-43.00 136 1471	-43.00 138 1444	-43.00 141 1455	-43.00 143 1471	-43.00 145 1487	-43.00 147 1503	-43.00 149 1519	-43.00 151 1535	-43.00 153 1551
-44.00 138 1487	-44.00 138 1496	-44.00 140 1469	-44.00 143 1480	-44.00 145 1496	-44.00 147 1512	-44.00 149 1528	-44.00 151 1544	-44.00 153 1560	-44.00 155 1576
-45.00 140 1512	-45.00 140 1521	-45.00 142 1504	-45.00 145 1515	-45.00 147 1531	-45.00 149 1547</				

TABLE 51 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IPOM 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = -25.00			LAT. = -25.00			LAT. = -25.00			LAT. = -25.00			LAT. = -25.00		
LONG. = 90.00			LONG. = 120.00			LONG. = 150.00			LONG. = 180.00			LONG. = 210.00		
REG	ASYMPTOTIC		REG	ASYMPTOTIC		REG	ASYMPTOTIC		REG	ASYMPTOTIC		REG	ASYMPTOTIC	
(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG	
20.00	17 147		20.00	14 105		20.00	11 204		20.00	8 273		20.00	5 243	
19.00	19 156		19.00	15 108		19.00	12 207		19.00	9 276		19.00	6 246	
18.00	22 153		18.00	18 112		18.00	15 211		18.00	12 281		18.00	9 250	
17.00	24 150		17.00	21 197		17.00	18 216		17.00	15 286		17.00	12 256	
16.00	26 143		16.00	23 202		16.00	20 222		16.00	18 293		16.00	15 263	
15.00	28 136		15.00	26 209		15.00	23 229		15.00	21 300		15.00	18 270	
14.00	29 126		14.00	28 216		14.00	26 236		14.00	24 307		14.00	21 278	
13.00	27 105		13.00	25 205		13.00	23 225		13.00	21 300		13.00	19 280	
12.00	24 194		12.00	22 216		12.00	20 234		12.00	18 303		12.00	16 283	
11.00	16 204		11.00	14 223		11.00	12 243		11.00	10 308		11.00	8 288	
10.00	4 215		10.00	-1 236		10.00	-8 255		10.00	-15 279		10.00	-22 301	
9.00	-12 231		9.00	-10 250		9.00	-18 275		9.00	-25 309		9.00	-32 330	
8.00	-13 233		8.00	-19 253		8.00	-25 279		8.00	-32 316		8.00	-39 336	
7.00	-15 235		7.00	-20 256		7.00	-26 283		7.00	-33 320		7.00	-40 338	
6.00	-17 236		6.00	-21 259		6.00	-27 287		6.00	-34 327		6.00	-41 342	
5.00	-18 241		5.00	-23 252		5.00	-28 292		5.00	-37 334		5.00	-44 348	
4.00	-20 245		4.00	-24 266		4.00	-29 297		4.00	-40 342		4.00	-46 353	
3.00	-22 248		3.00	-25 270		3.00	-30 303		3.00	-43 351		3.00	-49 361	
2.00	-24 253		2.00	-27 276		2.00	-32 311		2.00	-46 361		2.00	-52 369	
1.00	-26 258		1.00	-27 281		1.00	-33 319		1.00	-49 375		1.00	-54 378	
0.00	-28 264		0.00	-27 296		0.00	-34 329		0.00	-51 389		0.00	-56 389	
-1.00	-29 271		-1.00	-29 306		-1.00	-35 340		-1.00	-53 407		-1.00	-58 402	
-2.00	-29 279		-2.00	-30 316		-2.00	-36 354		-2.00	-55 421		-2.00	-60 412	
-3.00	-29 289		-3.00	-31 327		-3.00	-37 369		-3.00	-57 431		-3.00	-62 422	
-4.00	-30 298		-4.00	-32 332		-4.00	-38 383		-4.00	-59 441		-4.00	-64 432	
-5.00	-31 308		-5.00	-33 342		-5.00	-39 398		-5.00	-61 451		-5.00	-66 442	
-6.00	-32 316		-6.00	-34 353		-6.00	-40 413		-6.00	-63 461		-6.00	-68 452	
-7.00	-33 326		-7.00	-35 363		-7.00	-41 428		-7.00	-65 471		-7.00	-70 462	
-8.00	-34 336		-8.00	-36 374		-8.00	-42 443		-8.00	-67 481		-8.00	-72 472	
-9.00	-35 346		-9.00	-37 384		-9.00	-43 458		-9.00	-69 491		-9.00	-74 482	
-10.00	-36 356		-10.00	-38 395		-10.00	-44 473		-10.00	-71 501		-10.00	-76 492	
-11.00	-37 366		-11.00	-39 405		-11.00	-45 488		-11.00	-73 511		-11.00	-78 502	
-12.00	-38 376		-12.00	-40 416		-12.00	-46 503		-12.00	-75 521		-12.00	-80 512	
-13.00	-39 386		-13.00	-41 426		-13.00	-47 518		-13.00	-77 531		-13.00	-82 522	
-14.00	-40 396		-14.00	-42 437		-14.00	-48 533		-14.00	-79 541		-14.00	-84 532	
-15.00	-41 406		-15.00	-43 447		-15.00	-49 548		-15.00	-81 551		-15.00	-86 542	
-16.00	-42 416		-16.00	-44 458		-16.00	-50 563		-16.00	-83 561		-16.00	-88 552	
-17.00	-43 426		-17.00	-45 468		-17.00	-51 578		-17.00	-85 571		-17.00	-90 562	
-18.00	-44 436		-18.00	-46 479		-18.00	-52 593		-18.00	-87 581		-18.00	-92 572	
-19.00	-45 446		-19.00	-47 489		-19.00	-53 608		-19.00	-89 591		-19.00	-94 582	
-20.00	-46 456		-20.00	-48 500		-20.00	-54 623		-20.00	-91 601		-20.00	-96 592	
-21.00	-47 466		-21.00	-49 510		-21.00	-55 638		-21.00	-93 611		-21.00	-98 602	
-22.00	-48 476		-22.00	-50 521		-22.00	-56 653		-22.00	-95 621		-22.00	-100 612	
-23.00	-49 486		-23.00	-51 531		-23.00	-57 668		-23.00	-97 631		-23.00	-102 622	
-24.00	-50 496		-24.00	-52 542		-24.00	-58 683		-24.00	-99 641		-24.00	-104 632	
-25.00	-51 506		-25.00	-53 552		-25.00	-59 698		-25.00	-101 651		-25.00	-106 642	
-26.00	-52 516		-26.00	-54 563		-26.00	-60 713		-26.00	-103 661		-26.00	-108 652	
-27.00	-53 526		-27.00	-55 573		-27.00	-61 728		-27.00	-105 671		-27.00	-110 662	
-28.00	-54 536		-28.00	-56 584		-28.00	-62 743		-28.00	-107 681		-28.00	-112 672	
-29.00	-55 546		-29.00	-57 594		-29.00	-63 758		-29.00	-109 691		-29.00	-114 682	
-30.00	-56 556		-30.00	-58 605		-30.00	-64 773		-30.00	-111 701		-30.00	-116 692	
-31.00	-57 566		-31.00	-59 615		-31.00	-65 788		-31.00	-113 711		-31.00	-118 702	
-32.00	-58 576		-32.00	-60 626		-32.00	-66 803		-32.00	-115 721		-32.00	-120 712	
-33.00	-59 586		-33.00	-61 636		-33.00	-67 818		-33.00	-117 731		-33.00	-122 722	
-34.00	-60 596		-34.00	-62 647		-34.00	-68 833		-34.00	-119 741		-34.00	-124 732	
-35.00	-61 606		-35.00	-63 657		-35.00	-69 848		-35.00	-121 751		-35.00	-126 742	
-36.00	-62 616		-36.00	-64 668		-36.00	-70 863		-36.00	-123 761		-36.00	-128 752	
-37.00	-63 626		-37.00	-65 678		-37.00	-71 878		-37.00	-125 771		-37.00	-130 762	
-38.00	-64 636		-38.00	-66 689		-38.00	-72 893		-38.00	-127 781		-38.00	-132 772	
-39.00	-65 646		-39.00	-67 699		-39.00	-73 908		-39.00	-129 791		-39.00	-134 782	
-40.00	-66 656		-40.00	-68 710		-40.00	-74 923		-40.00	-131 801		-40.00	-136 792	
-41.00	-67 666		-41.00	-69 720		-41.00	-75 938		-41.00	-133 811		-41.00	-138 802	
-42.00	-68 676		-42.00	-70 731		-42.00	-76 953		-42.00	-135 821		-42.00	-140 812	
-43.00	-69 686		-43.00	-71 741		-43.00	-77 968		-43.00	-137 831		-43.00	-142 822	
-44.00	-70 696		-44.00	-72 752		-44.00	-78 983		-44.00	-139 841		-44.00	-144 832	
-45.00	-71 706		-45.00	-73 762		-45.00	-79 998		-45.00	-141 851		-45.00	-146 842	
-46.00	-72 716		-46.00	-74 773		-46.00	-80 103		-46.00	-143 861		-46.00	-148 852	
-47.00	-73 726		-47.00	-75 783		-47.00	-81 118		-47.00	-145 871		-47.00	-150 862	
-48.00	-74 736		-48.00	-76 794		-48.00	-82 128		-48.00	-147 881		-48.00	-152 872	
-49.00	-75 746		-49.00	-77 804		-49.00	-83 139		-49.00	-149 891		-49.00	-154 882	
-50.00	-76 756		-50.00	-78 815		-50.00	-84 149		-50.00	-151 901		-50.00	-156 892	
-51.00	-77 766		-51.00	-79 825		-51.00	-85 160		-51.00	-153 911		-51.00	-158 902	
-52.00	-78 776		-52.00	-80 836		-52.00	-86 170		-52.00	-155 921		-52.00	-160 912	
-53.00	-79 786		-53.00	-81 846		-53.00	-87 181		-53.00	-157 931		-53.00	-162 922	
-54.00	-80 796		-54.00	-82 857		-54.00	-88 191		-54.00	-159 941		-54.00	-164 932	
-55.00	-81 806		-55.00	-83 867		-55.00	-89 202		-55.00	-161 951		-55.00	-166 942	
-56.00	-82 816		-56.00	-84 878		-56.00	-90 212		-56.00	-163 961		-56.00	-168 952	
-57.00	-83 826		-57.00	-85 888		-57.00	-91 223		-57.00	-165 971		-57.00	-170 962	
-58.00	-84 836		-58.00	-86 899		-58.00	-92 233		-58.00	-167 981		-58.00	-172 972	
-59.00	-85 846		-59.00	-87 909		-59.00	-93 244		-59.00	-169 991		-59.00	-174 982	
-60.00	-86 856		-60.00	-88 920		-60.00	-94 254		-60.00	-171 101		-60.00	-176 992	
-61.00	-87 866		-61.00	-89 930		-61.00	-95 265		-61.00	-173 111		-61.00	-178 102	
-62.00	-88 876		-62.00	-90 941		-62.00	-96 275		-62.00	-175 121		-62.00	-180 112	
-63.00	-89 886		-63.00	-91 951		-63.00	-97 286		-63.00	-177 131		-63.00	-182 122	
-64.00	-90 896		-64.00	-92 962		-64.00	-98 296		-64.00	-179 141		-64.00	-184 132	
-65.00	-91 906		-65.00	-93 972		-65.00	-99 307		-65.00	-181 151		-65.00	-186 142	
-66.00	-92 916		-66.00	-94 983		-66.00	-100 317		-66.00	-183 161		-66.00	-188 152	
-67.00	-93 926		-67.00	-95 993		-67.00	-101 328		-67.00	-185 171		-67.00	-190 162	
-68.00	-94 936		-68.00	-96 104</										

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR SOME GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -25.00 LONG. = 180.00	GEOGRAPHIC LAT. = -25.00 LONG. = 195.00	GEOGRAPHIC LAT. = -25.00 LONG. = 210.00	GEOGRAPHIC LAT. = -25.00 LONG. = 225.00	GEOGRAPHIC LAT. = -25.00 LONG. = 240.00	GEOGRAPHIC LAT. = -25.00 LONG. = 255.00
REG. ASYMPTOTIC (Gd) LAT LONG	REG. ASYMPTOTIC (Gd) LAT LONG	REG. ASYMPTOTIC (Gd) LAT LONG	REG. ASYMPTOTIC (Gd) LAT LONG	REG. ASYMPTOTIC (Gd) LAT LONG	REG. ASYMPTOTIC (Gd) LAT LONG
20.00 3 253	21.00 1 -79	20.00 0 -62	20.00 -2 -46	20.00 -2 -21	20.00 -3 -18
19.00 4 247	19.00 2 -57	19.00 2 -57	19.00 1 -40	19.00 0 -26	19.00 0 -12
18.00 6 235	18.00 4 -68	18.00 5 -50	18.00 4 -36	18.00 5 -19	18.00 6 -6
17.00 10 200	17.00 5 -60	17.00 7 -62	17.00 6 -25	17.00 7 -10	17.00 7 7
16.00 11 206	16.00 4 -51	16.00 8 -51	16.00 9 -14	16.00 10 1	16.00 11 11
15.00 18 209	15.00 8 -58	15.00 6 -17	15.00 9 2	15.00 12 17	15.00 15 20
14.00 4 317	14.00 1 -21	14.00 3 4	14.00 6 76	14.00 10 43	14.00 15 96
13.00 -4 331	13.00 -1 6	13.00 3 7	13.00 5 29	13.00 10 47	13.00 15 50
12.00 -21 385	12.00 -17 10	12.00 2 10	12.00 5 33	12.00 9 61	12.00 16 62
11.00 -27 371	11.00 -12 15	11.00 1 13	11.00 4 37	11.00 8 54	11.00 16 66
10.00 -27 377	10.00 -15 20	10.00 0 16	10.00 3 41	10.00 7 60	10.00 13 71
9.00 -21 305	9.00 -14 26	9.00 -2 19	9.00 2 45	9.00 6 65	9.00 12 76
8.00 -18 305	8.00 -11 32	8.00 -1 23	8.00 1 51	8.00 5 72	8.00 10 81
7.00 -13 402	7.00 -11 40	7.00 -4 27	7.00 0 57	7.00 4 79	7.00 9 80
6.00 -4 418	6.00 -11 48	6.00 -1 48	6.00 0 63	6.00 3 87	6.00 7 95
5.00 -1 425	5.00 -3 58	5.00 -4 37	5.00 0 71	5.00 1 96	5.00 4 105
4.00 33 431	4.00 -2 78	4.00 -7 43	4.00 0 81	4.00 0 132	4.00 1 137
3.00 33 431	3.00 12 86	3.00 -6 56	3.00 0 86	3.00 0 136	3.00 0 136
2.00 33 431	2.00 30 113	2.00 -6 59	2.00 0 112	2.00 0 137	2.00 0 137
1.00 33 431	1.00 11 242	1.00 -4 68	1.00 0 146	1.00 0 168	1.00 0 168
0.00 33 431	0.00 11 242	0.00 -3 81	0.00 0 151	0.00 0 168	0.00 0 168
-1.00 33 431	-1.00 12 26	-1.00 5 97	-1.00 0 165	-1.00 0 167	-1.00 0 167
-2.00 33 431	-2.00 7 95	-2.00 3 126	-2.00 0 175	-2.00 0 175	-2.00 0 175
-3.00 33 431	-3.00 13 71	-3.00 20 131	-3.00 0 175	-3.00 0 175	-3.00 0 175
-4.00 33 431	-4.00 14 62	-4.00 21 137	-4.00 0 187	-4.00 0 187	-4.00 0 187
-5.00 33 431	-5.00 11 57	-5.00 22 143	-5.00 0 203	-5.00 0 175	-5.00 0 175
-6.00 33 431	-6.00 11 57	-6.00 22 151	-6.00 0 230	-6.00 0 175	-6.00 0 175
-7.00 33 431	-7.00 11 57	-7.00 21 159	-7.00 0 230	-7.00 0 175	-7.00 0 175
-8.00 33 431	-8.00 11 57	-8.00 21 169	-8.00 0 230	-8.00 0 175	-8.00 0 175
-9.00 33 431	-9.00 11 57	-9.00 21 178	-9.00 0 230	-9.00 0 175	-9.00 0 175
-10.00 33 431	-10.00 11 57	-10.00 21 183	-10.00 0 230	-10.00 0 175	-10.00 0 175
-11.00 33 431	-11.00 11 57	-11.00 21 191	-11.00 0 230	-11.00 0 175	-11.00 0 175
-12.00 33 431	-12.00 11 57	-12.00 21 199	-12.00 0 230	-12.00 0 175	-12.00 0 175
-13.00 33 431	-13.00 11 57	-13.00 21 207	-13.00 0 230	-13.00 0 175	-13.00 0 175
-14.00 33 431	-14.00 11 57	-14.00 21 215	-14.00 0 230	-14.00 0 175	-14.00 0 175
-15.00 33 431	-15.00 11 57	-15.00 21 223	-15.00 0 230	-15.00 0 175	-15.00 0 175
-16.00 33 431	-16.00 11 57	-16.00 21 231	-16.00 0 230	-16.00 0 175	-16.00 0 175
-17.00 33 431	-17.00 11 57	-17.00 21 239	-17.00 0 230	-17.00 0 175	-17.00 0 175
-18.00 33 431	-18.00 11 57	-18.00 21 247	-18.00 0 230	-18.00 0 175	-18.00 0 175
-19.00 33 431	-19.00 11 57	-19.00 21 255	-19.00 0 230	-19.00 0 175	-19.00 0 175
-20.00 33 431	-20.00 11 57	-20.00 21 263	-20.00 0 230	-20.00 0 175	-20.00 0 175
-21.00 33 431	-21.00 11 57	-21.00 21 271	-21.00 0 230	-21.00 0 175	-21.00 0 175
-22.00 33 431	-22.00 11 57	-22.00 21 279	-22.00 0 230	-22.00 0 175	-22.00 0 175
-23.00 33 431	-23.00 11 57	-23.00 21 287	-23.00 0 230	-23.00 0 175	-23.00 0 175
-24.00 33 431	-24.00 11 57	-24.00 21 295	-24.00 0 230	-24.00 0 175	-24.00 0 175
-25.00 33 431	-25.00 11 57	-25.00 21 303	-25.00 0 230	-25.00 0 175	-25.00 0 175

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = -25.00 LONG. = 205.00			LAT. = -25.00 LONG. = 205.00			LAT. = -25.00 LONG. = 205.00			LAT. = -25.00 LONG. = 205.00			LAT. = -25.00 LONG. = 205.00			LAT. = -25.00 LONG. = 205.00		
RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC	
(GV)	(GV)		(GV)	(GV)		(GV)	(GV)		(GV)	(GV)		(GV)	(GV)		(GV)	(GV)	
20.00	21.00	0	20.00	21.00	0	20.00	21.00	0	20.00	21.00	0	20.00	21.00	0	20.00	21.00	0
19.00	19.00	1	19.00	19.00	1	19.00	19.00	1	19.00	19.00	1	19.00	19.00	1	19.00	19.00	1
18.00	18.00	2	18.00	18.00	2	18.00	18.00	2	18.00	18.00	2	18.00	18.00	2	18.00	18.00	2
17.00	17.00	3	17.00	17.00	3	17.00	17.00	3	17.00	17.00	3	17.00	17.00	3	17.00	17.00	3
16.00	16.00	4	16.00	16.00	4	16.00	16.00	4	16.00	16.00	4	16.00	16.00	4	16.00	16.00	4
15.00	15.00	5	15.00	15.00	5	15.00	15.00	5	15.00	15.00	5	15.00	15.00	5	15.00	15.00	5
14.00	14.00	6	14.00	14.00	6	14.00	14.00	6	14.00	14.00	6	14.00	14.00	6	14.00	14.00	6
13.00	13.00	7	13.00	13.00	7	13.00	13.00	7	13.00	13.00	7	13.00	13.00	7	13.00	13.00	7
12.00	12.00	8	12.00	12.00	8	12.00	12.00	8	12.00	12.00	8	12.00	12.00	8	12.00	12.00	8
11.00	11.00	9	11.00	11.00	9	11.00	11.00	9	11.00	11.00	9	11.00	11.00	9	11.00	11.00	9
10.00	10.00	10	10.00	10.00	10	10.00	10.00	10	10.00	10.00	10	10.00	10.00	10	10.00	10.00	10
9.00	9.00	11	9.00	9.00	11	9.00	9.00	11	9.00	9.00	11	9.00	9.00	11	9.00	9.00	11
8.00	8.00	12	8.00	8.00	12	8.00	8.00	12	8.00	8.00	12	8.00	8.00	12	8.00	8.00	12
7.00	7.00	13	7.00	7.00	13	7.00	7.00	13	7.00	7.00	13	7.00	7.00	13	7.00	7.00	13
6.00	6.00	14	6.00	6.00	14	6.00	6.00	14	6.00	6.00	14	6.00	6.00	14	6.00	6.00	14
5.00	5.00	15	5.00	5.00	15	5.00	5.00	15	5.00	5.00	15	5.00	5.00	15	5.00	5.00	15
4.00	4.00	16	4.00	4.00	16	4.00	4.00	16	4.00	4.00	16	4.00	4.00	16	4.00	4.00	16
3.00	3.00	17	3.00	3.00	17	3.00	3.00	17	3.00	3.00	17	3.00	3.00	17	3.00	3.00	17
2.00	2.00	18	2.00	2.00	18	2.00	2.00	18	2.00	2.00	18	2.00	2.00	18	2.00	2.00	18
1.00	1.00	19	1.00	1.00	19	1.00	1.00	19	1.00	1.00	19	1.00	1.00	19	1.00	1.00	19
0.00	0.00	20	0.00	0.00	20	0.00	0.00	20	0.00	0.00	20	0.00	0.00	20	0.00	0.00	20
20.00	20.00	21	20.00	20.00	21	20.00	20.00	21	20.00	20.00	21	20.00	20.00	21	20.00	20.00	21
19.00	19.00	22	19.00	19.00													

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = -30.00		LAT. = -30.00		LAT. = -30.00		LAT. = -30.00		LAT. = -30.00		LAT. = -30.00	
LONG. = 0.00		LONG. = 30.00		LONG. = +5.00		LONG. = 60.00		LONG. = 75.00		LONG. = 90.00	
RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG
20.00	4 45	20.00	5 73	20.00	8 48	20.00	13 103	20.00	12 118	20.00	12 118
19.00	7 77	19.00	8 75	19.00	11 90	19.00	13 105	19.00	14 120	19.00	14 120
18.00	9 49	18.00	10 77	18.00	13 92	18.00	16 107	18.00	17 122	18.00	17 122
17.00	12 52	17.00	13 79	17.00	16 95	17.00	19 109	17.00	19 124	17.00	19 124
16.00	15 55	16.00	16 82	16.00	19 98	16.00	22 112	16.00	22 112	16.00	22 112
15.00	18 59	15.00	19 86	15.00	22 101	15.00	25 116	15.00	25 130	15.00	25 130
14.00	22 64	14.00	23 90	14.00	24 106	14.00	28 128	14.00	27 134	14.00	27 134
13.00	26 70	13.00	27 96	13.00	29 112	13.00	31 126	13.00	29 139	13.00	29 139
12.00	29 79	12.00	30 103	12.00	31 119	12.00	32 133	12.00	31 144	12.00	31 144
11.00	30 98	11.00	32 113	11.00	32 129	11.00	32 142	11.00	31 151	11.00	31 151
10.00	30 98	10.00	30 126	10.00	29 141	10.00	29 151	10.00	29 158	10.00	29 158
9.00	28 106	9.00	23 142	9.00	22 186	9.00	23 162	9.00	25 166	9.00	25 166
8.00	16 126	8.00	8 159	8.00	6 169	8.00	13 173	8.00	10 175	8.00	10 175
7.00	15 128	7.00	3 150	7.00	6 171	7.00	-1 195	7.00	18 190	7.00	18 190
6.00	13 138	6.00	3 152	6.00	5 173	6.00	-2 192	6.00	-12 227	6.00	-12 227
5.00	11 133	5.00	1 153	5.00	17 197	5.00	-4 195	5.00	-16 235	5.00	-16 235
4.00	8 135	4.00	-2 158	4.00	18 204	4.00	-6 198	4.00	-23 265	4.00	-23 265
3.00	6 138	3.00	-5 161	3.00	18 213	3.00	-8 202	3.00	-23 265	3.00	-23 265
2.00	3 141	2.00	-7 165	2.00	17 224	2.00	-10 206	2.00	-23 265	2.00	-23 265
1.00	0 144	1.00	-10 169	1.00	13 230	1.00	-12 211	1.00	-17 299	1.00	-17 299
0.00	-3 147	0.00	-13 174	0.00	9 237	0.00	-14 217	0.00	-17 306	0.00	-17 306
-1.00	-6 151	-1.00	-15 180	-1.00	6 246	-1.00	-17 225	-1.00	-17 309	-1.00	-17 309
-2.00	-9 154	-2.00	-17 188	-2.00	5 251	-2.00	-19 236	-2.00	-18 315	-2.00	-18 315
-3.00	-12 161	-3.00	-19 196	-3.00	4 256	-3.00	-19 248	-3.00	-18 322	-3.00	-18 322
-4.00	-14 167	-4.00	-16 208	-4.00	3 262	-4.00	-17 267	-4.00	-17 330	-4.00	-17 330
-5.00	-16 175	-5.00	-12 222	-5.00	2 336	-5.00	-17 302	-5.00	-17 330	-5.00	-17 330
-6.00	-17 185	-6.00	-9 241	-6.00	-1 359	-6.00	-17 308	-6.00	-17 330	-6.00	-17 330
-7.00	-18 190	-7.00	-6 279	-7.00	-4 412	-7.00	-17 308	-7.00	-17 330	-7.00	-17 330
-8.00	-19 215	-8.00	3 286	-8.00	-9 412	-8.00	-17 308	-8.00	-17 330	-8.00	-17 330
-9.00	-20 242	-9.00	7 294	-9.00	-12 412	-9.00	-17 308	-9.00	-17 330	-9.00	-17 330
-10.00	-21 266	-10.00	4 304	-10.00	-15 412	-10.00	-17 308	-10.00	-17 330	-10.00	-17 330
-11.00	-22 290	-11.00	1 316	-11.00	-18 412	-11.00	-17 308	-11.00	-17 330	-11.00	-17 330
-12.00	-23 316	-12.00	-1 335	-12.00	-21 412	-12.00	-17 308	-12.00	-17 330	-12.00	-17 330
-13.00	-24 342	-13.00	-4 355	-13.00	-24 412	-13.00	-17 308	-13.00	-17 330	-13.00	-17 330
-14.00	-25 368	-14.00	-7 377	-14.00	-27 412	-14.00	-17 308	-14.00	-17 330	-14.00	-17 330
-15.00	-26 394	-15.00	-10 399	-15.00	-30 412	-15.00	-17 308	-15.00	-17 330	-15.00	-17 330
-16.00	-27 420	-16.00	-13 421	-16.00	-33 412	-16.00	-17 308	-16.00	-17 330	-16.00	-17 330
-17.00	-28 446	-17.00	-16 443	-17.00	-36 412	-17.00	-17 308	-17.00	-17 330	-17.00	-17 330
-18.00	-29 472	-18.00	-19 465	-18.00	-39 412	-18.00	-17 308	-18.00	-17 330	-18.00	-17 330
-19.00	-30 498	-19.00	-22 487	-19.00	-42 412	-19.00	-17 308	-19.00	-17 330	-19.00	-17 330
-20.00	-31 524	-20.00	-25 509	-20.00	-45 412	-20.00	-17 308	-20.00	-17 330	-20.00	-17 330
-21.00	-32 550	-21.00	-28 531	-21.00	-48 412	-21.00	-17 308	-21.00	-17 330	-21.00	-17 330
-22.00	-33 576	-22.00	-31 553	-22.00	-51 412	-22.00	-17 308	-22.00	-17 330	-22.00	-17 330
-23.00	-34 602	-23.00	-34 575	-23.00	-54 412	-23.00	-17 308	-23.00	-17 330	-23.00	-17 330
-24.00	-35 628	-24.00	-37 597	-24.00	-57 412	-24.00	-17 308	-24.00	-17 330	-24.00	-17 330
-25.00	-36 654	-25.00	-40 619	-25.00	-60 412	-25.00	-17 308	-25.00	-17 330	-25.00	-17 330
-26.00	-37 680	-26.00	-43 641	-26.00	-63 412	-26.00	-17 308	-26.00	-17 330	-26.00	-17 330
-27.00	-38 706	-27.00	-46 663	-27.00	-66 412	-27.00	-17 308	-27.00	-17 330	-27.00	-17 330
-28.00	-39 732	-28.00	-49 685	-28.00	-69 412	-28.00	-17 308	-28.00	-17 330	-28.00	-17 330
-29.00	-40 758	-29.00	-52 707	-29.00	-72 412	-29.00	-17 308	-29.00	-17 330	-29.00	-17 330
-30.00	-41 784	-30.00	-55 729	-30.00	-75 412	-30.00	-17 308	-30.00	-17 330	-30.00	-17 330

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC (G) LAT. = -30.00 LONG. = 90.00	RIG ASYMPTOTIC (GVI) LAT LONG		GEOGRAPHIC (G) LAT. = -30.00 LONG. = 105.00		RIG ASYMPTOTIC (GVI) LAT LONG		GEOGRAPHIC (G) LAT. = -30.00 LONG. = 120.00		RIG ASYMPTOTIC (GVI) LAT LONG		GEOGRAPHIC (G) LAT. = -30.00 LONG. = 135.00		GEOGRAPHIC (G) LAT. = -30.00 LONG. = 150.00		RIG ASYMPTOTIC (GVI) LAT LONG		GEOGRAPHIC (G) LAT. = -30.00 LONG. = 165.00	
	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC	RIG	ASYMPTOTIC
20.00	13	135	20.00	10	154	20.00	8	173	20.00	6	193	20.00	4	213	20.00	2	233	
18.00	13	137	18.00	12	155	18.00	10	175	18.00	8	195	18.00	6	215	18.00	4	235	
16.00	16	139	16.00	15	157	16.00	13	177	16.00	11	197	16.00	9	218	16.00	7	238	
14.00	18	141	14.00	17	160	14.00	16	179	14.00	14	199	14.00	11	221	14.00	9	241	
12.00	21	143	12.00	20	162	12.00	18	182	12.00	16	202	12.00	14	224	12.00	12	244	
10.00	24	145	10.00	22	165	10.00	21	185	10.00	19	206	10.00	16	228	10.00	14	248	
8.00	26	147	8.00	25	167	8.00	23	187	8.00	21	208	8.00	18	230	8.00	16	250	
6.00	28	149	6.00	27	170	6.00	25	190	6.00	23	210	6.00	20	233	6.00	18	253	
4.00	29	151	4.00	28	172	4.00	26	192	4.00	24	212	4.00	21	235	4.00	19	255	
2.00	30	153	2.00	29	174	2.00	27	194	2.00	25	214	2.00	22	237	2.00	20	257	
0.00	28	170	0.00	25	188	0.00	22	208	0.00	18	231	0.00	15	258	0.00	13	274	
0.00	26	185	0.00	22	194	0.00	18	214	0.00	15	237	0.00	12	263	0.00	10	282	
0.00	24	200	0.00	19	203	0.00	15	223	0.00	12	246	0.00	9	276	0.00	7	296	
0.00	22	215	0.00	17	210	0.00	13	230	0.00	10	253	0.00	7	283	0.00	5	303	
0.00	20	230	0.00	15	225	0.00	11	245	0.00	8	268	0.00	5	299	0.00	3	319	
0.00	18	245	0.00	13	240	0.00	9	260	0.00	6	283	0.00	3	304	0.00	1	334	
0.00	16	260	0.00	11	255	0.00	7	275	0.00	4	298	0.00	1	319	0.00	0	349	
0.00	14	275	0.00	9	270	0.00	5	290	0.00	2	313	0.00	0	334	0.00	0	364	
0.00	12	290	0.00	7	285	0.00	3	305	0.00	0	328	0.00	0	349	0.00	0	389	
0.00	10	305	0.00	5	300	0.00	1	320	0.00	0	343	0.00	0	364	0.00	0	404	
0.00	8	320	0.00	3	315	0.00	0	335	0.00	0	358	0.00	0	379	0.00	0	419	
0.00	6	335	0.00	1	330	0.00	0	350	0.00	0	373	0.00	0	394	0.00	0	434	
0.00	4	350	0.00	0	345	0.00	0	365	0.00	0	388	0.00	0	409	0.00	0	449	
0.00	2	365	0.00	0	360	0.00	0	380	0.00	0	403	0.00	0	424	0.00	0	464	
0.00	0	380	0.00	0	375	0.00	0	395	0.00	0	418	0.00	0	439	0.00	0	479	
0.00	0	395	0.00	0	390	0.00	0	410	0.00	0	433	0.00	0	454	0.00	0	494	
0.00	0	410	0.00	0	405	0.00	0	425	0.00	0	448	0.00	0	469	0.00	0	504	
0.00	0	425	0.00	0	420	0.00	0	440	0.00	0	465	0.00	0	480	0.00	0	519	
0.00	0	440	0.00	0	435	0.00	0	455	0.00	0	480	0.00	0	495	0.00	0	534	
0.00	0	455	0.00	0	450	0.00	0	470	0.00	0	495	0.00	0	510	0.00	0	549	
0.00	0	470	0.00	0	465	0.00	0	485	0.00	0	510	0.00	0	525	0.00	0	564	
0.00	0	485	0.00	0	480	0.00	0	490	0.00	0	525	0.00	0	540	0.00	0	579	
0.00	0	500	0.00	0	495	0.00	0	505	0.00	0	540	0.00	0	555	0.00	0	594	
0.00	0	515	0.00	0	510	0.00	0	520	0.00	0	555	0.00	0	570	0.00	0	609	
0.00	0	530	0.00	0	525	0.00	0	535	0.00	0	570	0.00	0	585	0.00	0	624	
0.00	0	545	0.00	0	540	0.00	0	550	0.00	0	585	0.00	0	600	0.00	0	639	
0.00	0	560	0.00	0	555	0.00	0	565	0.00	0	600	0.00	0	615	0.00	0	654	
0.00	0	575	0.00	0	570	0.00	0	580	0.00	0	615	0.00	0	630	0.00	0	669	
0.00	0	590	0.00	0	585	0.00	0	595	0.00	0	630	0.00	0	645	0.00	0	684	
0.00	0	605	0.00	0	590	0.00	0	600	0.00	0	645	0.00	0	660	0.00	0	699	
0.00	0	620	0.00	0	605	0.00	0	610	0.00	0	660	0.00	0	675	0.00	0	714	
0.00	0	635	0.00	0	620	0.00	0	625	0.00	0	675	0.00	0	690	0.00	0	729	
0.00	0	650	0.00	0	635	0.00	0	640	0.00	0	690	0.00	0	705	0.00	0	744	
0.00	0	665	0.00	0	650	0.00	0	655	0.00	0	705	0.00	0	720	0.00	0	759	
0.00	0	680	0.00	0	665	0.00	0	670	0.00	0	720	0.00	0	735	0.00	0	774	
0.00	0	695	0.00	0	680	0.00	0	685	0.00	0	735	0.00	0	750	0.00	0	789	
0.00	0	710	0.00	0	695	0.00	0	700	0.00	0	750	0.00	0	765	0.00	0	804	
0.00	0	725	0.00	0	710	0.00	0	715	0.00	0	765	0.00	0	780	0.00	0	819	
0.00	0	740	0.00	0	725	0.00	0	730	0.00	0	780	0.00	0	795	0.00	0	834	
0.00	0	755	0.00	0	740	0.00	0	745	0.00	0	795	0.00	0	810	0.00	0	849	
0.00	0	770	0.00	0	755	0.00	0	760	0.00	0	810	0.00	0	825	0.00	0	864	
0.00	0	785	0.00	0	770	0.00	0	775	0.00	0	825	0.00	0	840	0.00	0	879	
0.00	0	800	0.00	0	785	0.00	0	790	0.00	0	840	0.00	0	855	0.00	0	894	
0.00	0	815	0.00	0	800	0.00	0	805	0.00	0	855	0.00	0	870	0.00	0	909	
0.00	0	830	0.00	0	815	0.00	0	820	0.00	0	870	0.00	0	885	0.00	0	924	
0.00	0	845	0.00	0	830	0.00	0	835	0.00	0	885	0.00	0	900	0.00	0	939	
0.00	0	860	0.00	0	845	0.00	0	850	0.00	0	900	0.00	0	915	0.00	0	954	
0.00	0	875	0.00	0	860	0.00	0	865	0.00	0	915	0.00	0	930	0.00	0	969	
0.00	0	890	0.00	0	875	0.00	0	880	0.00	0	930	0.00	0	945	0.00	0	984	
0.00	0	905	0.00	0	890	0.00	0	895	0.00	0	945	0.00	0	960	0.00	0	999	
0.00	0	920	0.00	0	905	0.00	0	910	0.00	0	960	0.00	0	975	0.00	0	1014	
0.00	0	935	0.00	0	920	0.00	0	925	0.00	0	975	0.00	0	990	0.00	0	1029	
0.00	0	950	0.00	0	935	0.00	0	940	0.00	0	990	0.00	0	1005	0.00	0	1044	
0.00	0	965	0.00	0	950	0.00	0	955	0.00	0	1005	0.00	0	1020	0.00	0	1059	
0.00	0	980	0.00	0	965	0.00	0	970	0.00	0	1020	0.00	0	1035	0.00	0	1074	
0.00	0	995	0.00	0	980	0.00	0	985	0.00	0	1035	0.00	0	1050	0.00	0	1089	
0.00	0	1010	0.00	0	995	0.00	0	1000	0.00	0	1050	0.00	0	1065	0.00	0	1104	
0.00	0	1025	0.00	0	1010	0.00	0	1015	0.00	0	1065	0.00	0	1080	0.00	0	1119	
0.00	0	1040	0.00	0	1025	0.00	0	1030	0.00	0	1080	0.00	0	1095	0.00	0	1134	
0.00	0	1055	0.00	0	1040	0.00	0	1045	0.00	0	1095	0.00	0	1110	0.00	0	1149	
0.00	0	1070	0.00	0	1055	0.00	0	1060	0.00	0	1110	0.00	0	1125	0.00	0	1164	
0.00	0	1085	0.00	0	1070	0.00	0	1075	0.00	0	1125	0.00	0	1140	0.00	0	1179	
0.00	0	1100	0.00	0	1085	0.00	0	1090	0.00	0	1140	0.00	0	1155	0.00	0	1194	
0.00	0	1115	0.00	0	1100	0.00	0	1105	0.00	0	1155	0.00	0	1170	0.00	0	1209	
0.00	0	1130	0.00	0	1115	0.00	0	1120	0.00	0	1170	0.00	0	1185	0.00	0	1224	
0.00	0	1145	0.00	0	1130	0.00	0	1135	0.00	0	1185	0.00	0	1200	0.00	0	1239	
0.00	0	1160	0.00	0	1145	0.00	0	1150	0.00	0	1200	0.00	0	1215	0.00	0	1254	
0.00	0	1175	0.00	0														

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = -35.00 LONG. = 0.00		LAT. = -35.00 LONG. = 15.00		LAT. = -35.00 LONG. = 30.00		LAT. = -35.00 LONG. = 45.00		LAT. = -35.00 LONG. = 60.00	
RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG	
20.00	0 41	20.00	0 54	20.00	1 08	20.00	3 02	20.00	5 95
19.00	2 42	19.00	2 55	19.00	3 09	19.00	6 01	19.00	7 110
18.00	5 44	18.00	4 57	18.00	6 70	18.00	8 84	18.00	10 111
17.00	8 46	17.00	7 58	17.00	9 72	17.00	11 86	17.00	12 112
16.00	11 48	16.00	10 60	16.00	11 74	16.00	14 87	16.00	14 113
15.00	14 51	15.00	13 63	15.00	15 76	15.00	17 89	15.00	17 114
14.00	18 54	14.00	17 65	14.00	18 79	14.00	21 92	14.00	20 116
13.00	22 54	13.00	21 69	13.00	22 82	13.00	24 95	13.00	22 118
12.00	26 54	12.00	25 74	12.00	26 86	12.00	27 99	12.00	24 120
11.00	30 72	11.00	29 80	11.00	30 92	11.00	30 104	11.00	26 122
10.00	32 82	10.00	32 89	10.00	32 100	10.00	32 110	10.00	27 126
9.00	30 97	9.00	30 100	9.00	32 109	9.00	32 118	9.00	27 129
8.00	21 114	8.00	23 113	8.00	24 120	8.00	29 127	8.00	28 135
7.00	2 134	7.00	17 126	7.00	22 132	7.00	24 137	7.00	28 145
6.00	14 172	6.00	1 148	6.00	11 148	6.00	17 153	6.00	25 164
5.00	14 179	5.00	-1 151	5.00	9 151	5.00	-7 146	5.00	25 166
4.00	13 191	4.00	-3 155	4.00	8 153	4.00	-13 207	4.00	24 169
3.00	17 206	3.00	-5 159	3.00	6 156	3.00	-18 224	3.00	22 176
2.00	3 228	2.00	-7 164	2.00	4 159	2.00	-25 254	2.00	22 176
1.00	4 232	1.00	-3 169	1.00	2 163	1.00	-30 550	1.00	21 179
0.00	5 235	0.00	-11 176	0.00	0 167	0.00	-30 640	0.00	19 183
5.00	5 239	5.00	-11 185	5.00	-1 171	5.00	-30 640	5.00	17 186
4.00	6 243	4.00	-14 197	4.00	-5 177	4.00	-30 640	4.00	17 186
3.00	8 248	3.00	-12 215	3.00	-9 185	3.00	-30 640	3.00	17 186
2.00	9 254	2.00	-3 246	2.00	-12 194	2.00	-30 640	2.00	17 186
1.00	10 260	1.00	-2 248	1.00	-15 206	1.00	-30 640	1.00	17 186
0.00	9 266	0.00	-1 253	0.00	-15 210	0.00	-30 640	0.00	17 186
5.00	7 277	5.00	1 259	5.00	-15 213	5.00	-30 640	5.00	17 186
4.00	3 288	4.00	1 266	4.00	-14 216	4.00	-30 640	4.00	17 186
3.00	5 303	3.00	4 274	3.00	-13 218	3.00	-30 640	3.00	17 186
2.00	5 308	2.00	4 284	2.00	-12 220	2.00	-30 640	2.00	17 186
1.00	5 318	1.00	3 298	1.00	-11 222	1.00	-30 640	1.00	17 186
0.00	5 327	0.00	-2 318	0.00	-9 227	0.00	-30 640	0.00	17 186
5.00	5 331	5.00	-15 160	5.00	-7 263	5.00	-30 640	5.00	17 186
4.00	5 335	4.00	-11 440	4.00	-5 269	4.00	-30 640	4.00	17 186
3.00	5 339	3.00	-2 744	3.00	-3 277	3.00	-30 640	3.00	17 186
2.00	5 343	2.00	4 284	2.00	0 286	2.00	-30 640	2.00	17 186
1.00	5 347	1.00	3 298	1.00	2 298	1.00	-30 640	1.00	17 186
0.00	5 351	0.00	-1 253	0.00	3 317	0.00	-30 640	0.00	17 186
5.00	5 355	5.00	-4 351	5.00	-4 351	5.00	-30 640	5.00	17 186
4.00	5 359	4.00	-1 253	4.00	-4 351	4.00	-30 640	4.00	17 186
3.00	5 363	3.00	4 284	3.00	0 286	3.00	-30 640	3.00	17 186
2.00	5 367	2.00	3 298	2.00	2 298	2.00	-30 640	2.00	17 186
1.00	5 371	1.00	-1 253	1.00	3 317	1.00	-30 640	1.00	17 186
0.00	5 375	0.00	-4 351	0.00	-4 351	0.00	-30 640	0.00	17 186

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -35.00 LONG. = 278.00	GEOGRAPHIC LAT. = -35.00 LONG. = 205.00	GEOGRAPHIC LAT. = -35.00 LONG. = 180.00	GEOGRAPHIC LAT. = -35.00 LONG. = 115.00	GEOGRAPHIC LAT. = -35.00 LONG. = 130.00	GEOGRAPHIC LAT. = -35.00 LONG. = 345.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 -5 -14	20.00 -3 -4	20.00 -1 5	20.00 1 12	20.00 2 20	20.00 1 29
19.00 -5 -10	19.00 0 0	19.00 2 8	19.00 4 15	19.00 5 22	19.00 6 31
18.00 2 -6	18.00 6 6	18.00 6 11	18.00 7 10	18.00 8 25	18.00 9 35
17.00 7 -1	17.00 9 15	17.00 9 15	17.00 11 21	17.00 11 27	17.00 13 36
16.00 12 6	16.00 13 14	16.00 14 21	16.00 15 26	16.00 16 31	16.00 18 41
15.00 17 14	15.00 18 22	15.00 18 28	15.00 19 32	15.00 19 35	15.00 20 41
14.00 22 27	14.00 23 34	14.00 23 37	14.00 23 39	14.00 23 41	14.00 24 49
13.00 26 40	13.00 26 52	13.00 27 52	13.00 27 51	13.00 27 49	13.00 28 59
12.00 31 53	12.00 32 01	12.00 32 74	12.00 29 67	12.00 30 61	12.00 30 61
11.00 36 56	11.00 36 89	11.00 36 77	11.00 27 91	11.00 27 77	11.00 27 77
10.00 41 59	10.00 41 89	10.00 41 80	10.00 20 94	10.00 20 100	10.00 20 100
9.00 46 59	9.00 46 89	9.00 46 80	9.00 16 97	9.00 16 135	9.00 16 135
8.00 51 59	8.00 51 89	8.00 51 80	8.00 16 100	8.00 16 135	8.00 16 135
7.00 56 59	7.00 56 89	7.00 56 80	7.00 16 100	7.00 16 135	7.00 16 135
6.00 61 59	6.00 61 89	6.00 61 80	6.00 16 100	6.00 16 135	6.00 16 135
5.00 66 59	5.00 66 89	5.00 66 80	5.00 16 100	5.00 16 135	5.00 16 135
4.00 71 59	4.00 71 89	4.00 71 80	4.00 16 100	4.00 16 135	4.00 16 135
3.00 76 59	3.00 76 89	3.00 76 80	3.00 16 100	3.00 16 135	3.00 16 135
2.00 81 59	2.00 81 89	2.00 81 80	2.00 16 100	2.00 16 135	2.00 16 135
1.00 86 59	1.00 86 89	1.00 86 80	1.00 16 100	1.00 16 135	1.00 16 135
0.00 91 59	0.00 91 89	0.00 91 80	0.00 16 100	0.00 16 135	0.00 16 135
-1.00 96 59	-1.00 96 89	-1.00 96 80	-1.00 16 100	-1.00 16 135	-1.00 16 135
-2.00 101 59	-2.00 101 89	-2.00 101 80	-2.00 16 100	-2.00 16 135	-2.00 16 135
-3.00 106 59	-3.00 106 89	-3.00 106 80	-3.00 16 100	-3.00 16 135	-3.00 16 135
-4.00 111 59	-4.00 111 89	-4.00 111 80	-4.00 16 100	-4.00 16 135	-4.00 16 135
-5.00 116 59	-5.00 116 89	-5.00 116 80	-5.00 16 100	-5.00 16 135	-5.00 16 135
-6.00 121 59	-6.00 121 89	-6.00 121 80	-6.00 16 100	-6.00 16 135	-6.00 16 135
-7.00 126 59	-7.00 126 89	-7.00 126 80	-7.00 16 100	-7.00 16 135	-7.00 16 135
-8.00 131 59	-8.00 131 89	-8.00 131 80	-8.00 16 100	-8.00 16 135	-8.00 16 135
-9.00 136 59	-9.00 136 89	-9.00 136 80	-9.00 16 100	-9.00 16 135	-9.00 16 135
-10.00 141 59	-10.00 141 89	-10.00 141 80	-10.00 16 100	-10.00 16 135	-10.00 16 135
-11.00 146 59	-11.00 146 89	-11.00 146 80	-11.00 16 100	-11.00 16 135	-11.00 16 135
-12.00 151 59	-12.00 151 89	-12.00 151 80	-12.00 16 100	-12.00 16 135	-12.00 16 135
-13.00 156 59	-13.00 156 89	-13.00 156 80	-13.00 16 100	-13.00 16 135	-13.00 16 135
-14.00 161 59	-14.00 161 89	-14.00 161 80	-14.00 16 100	-14.00 16 135	-14.00 16 135
-15.00 166 59	-15.00 166 89	-15.00 166 80	-15.00 16 100	-15.00 16 135	-15.00 16 135
-16.00 171 59	-16.00 171 89	-16.00 171 80	-16.00 16 100	-16.00 16 135	-16.00 16 135
-17.00 176 59	-17.00 176 89	-17.00 176 80	-17.00 16 100	-17.00 16 135	-17.00 16 135
-18.00 181 59	-18.00 181 89	-18.00 181 80	-18.00 16 100	-18.00 16 135	-18.00 16 135
-19.00 186 59	-19.00 186 89	-19.00 186 80	-19.00 16 100	-19.00 16 135	-19.00 16 135
-20.00 191 59	-20.00 191 89	-20.00 191 80	-20.00 16 100	-20.00 16 135	-20.00 16 135
-21.00 196 59	-21.00 196 89	-21.00 196 80	-21.00 16 100	-21.00 16 135	-21.00 16 135
-22.00 201 59	-22.00 201 89	-22.00 201 80	-22.00 16 100	-22.00 16 135	-22.00 16 135
-23.00 206 59	-23.00 206 89	-23.00 206 80	-23.00 16 100	-23.00 16 135	-23.00 16 135
-24.00 211 59	-24.00 211 89	-24.00 211 80	-24.00 16 100	-24.00 16 135	-24.00 16 135
-25.00 216 59	-25.00 216 89	-25.00 216 80	-25.00 16 100	-25.00 16 135	-25.00 16 135
-26.00 221 59	-26.00 221 89	-26.00 221 80	-26.00 16 100	-26.00 16 135	-26.00 16 135
-27.00 226 59	-27.00 226 89	-27.00 226 80	-27.00 16 100	-27.00 16 135	-27.00 16 135
-28.00 231 59	-28.00 231 89	-28.00 231 80	-28.00 16 100	-28.00 16 135	-28.00 16 135
-29.00 236 59	-29.00 236 89	-29.00 236 80	-29.00 16 100	-29.00 16 135	-29.00 16 135
-30.00 241 59	-30.00 241 89	-30.00 241 80	-30.00 16 100	-30.00 16 135	-30.00 16 135
-31.00 246 59	-31.00 246 89	-31.00 246 80	-31.00 16 100	-31.00 16 135	-31.00 16 135
-32.00 251 59	-32.00 251 89	-32.00 251 80	-32.00 16 100	-32.00 16 135	-32.00 16 135
-33.00 256 59	-33.00 256 89	-33.00 256 80	-33.00 16 100	-33.00 16 135	-33.00 16 135
-34.00 261 59	-34.00 261 89	-34.00 261 80	-34.00 16 100	-34.00 16 135	-34.00 16 135
-35.00 266 59	-35.00 266 89	-35.00 266 80	-35.00 16 100	-35.00 16 135	-35.00 16 135

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = -40.00 LONG. = 90.00		LAT. = -40.00 LONG. = 105.00		LAT. = -40.00 LONG. = 120.00		LAT. = -40.00 LONG. = 135.00		LAT. = -40.00 LONG. = 150.00		LAT. = -40.00 LONG. = 165.00	
RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG		RIG ASYMPTOTIC (GV) LAT LONG	
20.00	-5 117	21.00	-1 116	20.00	-10 155	20.00	-11 176	20.00	-12 197	20.00	-12 218
19.00	-5 117	19.00	-6 116	19.00	-8 156	19.00	-9 176	19.00	-10 197	19.00	-10 219
18.00	-1 110	18.00	-6 116	18.00	-6 156	18.00	-7 177	18.00	-8 198	18.00	-8 220
17.00	0 118	17.00	-2 116	17.00	-4 156	17.00	-5 177	17.00	-6 199	17.00	-5 221
16.00	2 118	16.00	0 117	16.00	-2 157	16.00	-3 178	16.00	-3 200	16.00	-3 222
15.00	4 116	15.00	1 117	15.00	0 157	15.00	-1 178	15.00	-1 200	15.00	0 223
14.00	6 118	14.00	3 117	14.00	2 157	14.00	1 178	14.00	1 201	14.00	2 224
13.00	7 119	13.00	5 117	13.00	3 157	13.00	3 179	13.00	3 202	13.00	5 226
12.00	9 119	12.00	7 117	12.00	5 158	12.00	4 179	12.00	5 202	12.00	7 227
11.00	10 119	11.00	9 118	11.00	6 158	11.00	5 180	11.00	6 203	11.00	8 228
10.00	10 121	10.00	9 119	10.00	6 159	10.00	6 181	10.00	7 205	10.00	8 230
9.00	11 122	9.00	8 121	9.00	7 161	9.00	6 183	9.00	7 207	9.00	8 233
8.00	12 126	8.00	10 125	8.00	8 165	8.00	7 187	8.00	8 211	8.00	8 238
7.00	13 132	7.00	13 130	7.00	11 171	7.00	10 194	7.00	9 219	7.00	6 247
6.00	22 141	6.00	20 158	6.00	18 180	6.00	16 204	6.00	14 232	6.00	11 263
5.00	24 152	5.00	24 167	5.00	22 189	5.00	19 215	5.00	14 247	5.00	5 288
4.00	26 166	4.00	24 181	4.00	20 203	4.00	15 230	4.00	6 265	4.00	3 290
3.00	29 169	3.00	23 183	3.00	20 206	3.00	15 233	3.00	5 269	4.00	1 291
2.00	25 172	2.00	21 186	2.00	20 209	2.00	14 237	2.00	3 274	4.00	-1 295
1.00	25 175	1.00	21 190	1.00	20 213	1.00	13 241	1.00	3 279	4.00	-3 298
0.00	24 179	0.00	21 194	0.00	19 216	0.00	11 246	0.00	3 286	4.00	-5 300
3.50	23 184	3.50	22 198	3.50	18 220	3.50	9 250	3.50	-8 303	4.00	-6 303
3.00	21 189	3.00	21 202	3.00	16 224	3.00	6 255	3.00	-13 302	4.00	-8 306
3.00	18 194	3.00	17 206	3.00	14 227	3.00	3 259	3.00	-20 313	4.00	-10 310
3.00	15 199	3.00	17 209	3.00	12 231	3.00	-1 263	3.00	-25 327	4.00	-12 314
3.00	11 203	3.00	15 212	3.00	9 234	3.00	-4 267	3.00	-26 345	4.00	-14 320
3.00	7 207	3.00	12 215	3.00	7 237	3.00	-8 272	3.00	-17 366	3.00	-16 328
2.00	3 211	2.00	9 218	2.00	4 240	2.00	-11 277	2.00	15 407	3.00	-19 339
2.00	-1 216	2.00	6 223	2.00	1 246	2.00	-14 286	2.00	21 416	3.00	-20 349
2.00	-6 223	2.00	2 229	2.00	-4 253	2.00	-27 300	2.00	28 431	3.00	-25 353
2.00	-13 236	2.00	-4 238	2.00	-12 264	2.00	-27 330	2.00	28 455	3.00	-29 359
2.00	-23 259	2.00	-14 251	2.00	-23 282	2.00	-26 421	2.00	28 485	3.00	-34 369
2.00	-24 258	2.00	-26 252	2.00	-29 313	2.00	-5 508	2.00	-1 605	3.00	-41 380
2.00	-25 262	2.00	-24 313	2.00	-26 317	2.00	0 606	2.00	-1 605	3.00	-41 380
2.00	-26 266	2.00	-3 608	2.00	-27 321	2.00	20 712	2.00	2 604	3.00	-41 380
2.00	-26 270	2.00	17 911	2.00	-26 326	2.00	12 425	2.00	2 604	3.00	-41 380
2.00	-26 276	2.00	-1 956	2.00	-24 331	2.00	-13 1043	2.00	2 604	3.00	-41 380
2.00	-26 282	2.00	4 421	2.00	-22 335	2.00	5 443	2.00	2 604	3.00	-41 380
2.00	-26 288	2.00	7 407	2.00	-20 341	2.00	5 443	2.00	2 604	3.00	-41 380
2.00	-23 296	2.00	21 464	2.00	-19 346	2.00	2 42	2.00	2 604	3.00	-41 380
2.00	-20 304	2.00	22 504	2.00	-10 352	2.00	2 42	2.00	2 604	3.00	-41 380
2.00	-15 314	2.00	13 473	2.00	-4 358	2.00	2 42	2.00	2 604	3.00	-41 380
2.00	-8 326	2.00	6 458	2.00	3 366	2.00	2 42	2.00	2 604	3.00	-41 380
2.00	4 344	2.00	11 377	2.00	11 377	2.00	2 42	2.00	2 604	3.00	-41 380
2.00	14 384	2.00	20 395	2.00	20 395	2.00	2 42	2.00	2 604	3.00	-41 380
2.00	5 525	2.00	21 433	2.00	21 433	2.00	2 42	2.00	2 604	3.00	-41 380
2.00	R	2.00	-19 693	2.00	-19 693	2.00	2 42	2.00	2 604	3.00	-41 380
2.00	R	2.00	2 425	2.00	2 425	2.00	2 42	2.00	2 604	3.00	-41 380

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR MONOMER LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IGRF, 1975-0)

GEOMAGNETIC LAT. λ -40.00 LONG. λ 100.00	GEOMAGNETIC LAT. λ -40.00 LONG. λ 210.00	GEOMAGNETIC LAT. λ -40.00 LONG. λ 225.00	GEOMAGNETIC LAT. λ -40.00 LONG. λ 240.00	GEOMAGNETIC LAT. λ -40.00 LONG. λ 255.00
20.00 -12 239	20.00 -11 -82	20.00 -11 -64	20.00 -10 -46	20.00 -9 -30
19.00 -10 240	19.00 -9 -80	19.00 -8 -61	19.00 -7 -43	19.00 -6 -27
18.00 -9 241	18.00 -8 -78	18.00 -7 -58	18.00 -6 -40	18.00 -5 -24
17.00 -8 243	17.00 -7 -75	17.00 -6 -55	17.00 -5 -37	17.00 -4 -20
16.00 -7 244	16.00 -6 -72	16.00 -5 -52	16.00 -4 -34	16.00 -3 -16
15.00 -6 246	15.00 -5 -69	15.00 -4 -49	15.00 -3 -31	15.00 -2 -9
14.00 -5 248	14.00 -4 -65	14.00 -3 -45	14.00 -2 -27	14.00 -1 -11
13.00 -4 250	13.00 -3 -62	13.00 -2 -42	13.00 -1 -24	13.00 0 -8
12.00 -3 253	12.00 -2 -59	12.00 -1 -39	12.00 0 -21	12.00 0 0
11.00 -2 255	11.00 -1 -56	11.00 0 -36	11.00 0 -24	11.00 0 0
10.00 -1 258	10.00 0 -53	10.00 0 -33	10.00 0 -21	10.00 0 0
9.00 0 262	9.00 0 -50	9.00 0 -30	9.00 0 -18	9.00 0 0
8.00 1 266	8.00 0 -47	8.00 0 -27	8.00 0 -15	8.00 0 0
7.00 2 270	7.00 0 -44	7.00 0 -24	7.00 0 -12	7.00 0 0
6.00 3 274	6.00 0 -41	6.00 0 -21	6.00 0 -9	6.00 0 0
5.00 4 278	5.00 0 -38	5.00 0 -18	5.00 0 -6	5.00 0 0
4.00 5 282	4.00 0 -35	4.00 0 -15	4.00 0 -3	4.00 0 0
3.00 6 286	3.00 0 -32	3.00 0 -12	3.00 0 0	3.00 0 0
2.00 7 290	2.00 0 -29	2.00 0 -9	2.00 0 3	2.00 0 6
1.00 8 294	1.00 0 -26	1.00 0 -6	1.00 0 6	1.00 0 9
0.00 9 298	0.00 0 -23	0.00 0 -3	0.00 0 9	0.00 0 12
-1.00 10 302	-1.00 0 -20	-1.00 0 0	-1.00 0 12	-1.00 0 15
-2.00 11 306	-2.00 0 -17	-2.00 0 3	-2.00 0 15	-2.00 0 18
-3.00 12 310	-3.00 0 -14	-3.00 0 6	-3.00 0 18	-3.00 0 21
-4.00 13 314	-4.00 0 -11	-4.00 0 9	-4.00 0 21	-4.00 0 24
-5.00 14 318	-5.00 0 -8	-5.00 0 12	-5.00 0 24	-5.00 0 27
-6.00 15 322	-6.00 0 -5	-6.00 0 15	-6.00 0 27	-6.00 0 30
-7.00 16 326	-7.00 0 -2	-7.00 0 18	-7.00 0 30	-7.00 0 33
-8.00 17 330	-8.00 0 1	-8.00 0 21	-8.00 0 33	-8.00 0 36
-9.00 18 334	-9.00 0 4	-9.00 0 24	-9.00 0 36	-9.00 0 39
-10.00 19 338	-10.00 0 7	-10.00 0 27	-10.00 0 39	-10.00 0 42
-11.00 20 342	-11.00 0 10	-11.00 0 30	-11.00 0 42	-11.00 0 45
-12.00 21 346	-12.00 0 13	-12.00 0 33	-12.00 0 45	-12.00 0 48
-13.00 22 350	-13.00 0 16	-13.00 0 36	-13.00 0 48	-13.00 0 51
-14.00 23 354	-14.00 0 19	-14.00 0 39	-14.00 0 51	-14.00 0 54
-15.00 24 358	-15.00 0 22	-15.00 0 42	-15.00 0 54	-15.00 0 57
-16.00 25 362	-16.00 0 25	-16.00 0 45	-16.00 0 57	-16.00 0 60
-17.00 26 366	-17.00 0 28	-17.00 0 48	-17.00 0 60	-17.00 0 63
-18.00 27 370	-18.00 0 31	-18.00 0 51	-18.00 0 63	-18.00 0 66
-19.00 28 374	-19.00 0 34	-19.00 0 54	-19.00 0 66	-19.00 0 69
-20.00 29 378	-20.00 0 37	-20.00 0 57	-20.00 0 69	-20.00 0 72
-21.00 30 382	-21.00 0 40	-21.00 0 60	-21.00 0 72	-21.00 0 75
-22.00 31 386	-22.00 0 43	-22.00 0 63	-22.00 0 75	-22.00 0 78
-23.00 32 390	-23.00 0 46	-23.00 0 66	-23.00 0 78	-23.00 0 81
-24.00 33 394	-24.00 0 49	-24.00 0 69	-24.00 0 81	-24.00 0 84
-25.00 34 398	-25.00 0 52	-25.00 0 72	-25.00 0 84	-25.00 0 87
-26.00 35 402	-26.00 0 55	-26.00 0 75	-26.00 0 87	-26.00 0 90
-27.00 36 406	-27.00 0 58	-27.00 0 78	-27.00 0 90	-27.00 0 93
-28.00 37 410	-28.00 0 61	-28.00 0 81	-28.00 0 93	-28.00 0 96
-29.00 38 414	-29.00 0 64	-29.00 0 84	-29.00 0 96	-29.00 0 99
-30.00 39 418	-30.00 0 67	-30.00 0 87	-30.00 0 99	-30.00 1 02
-31.00 40 422	-31.00 0 70	-31.00 0 90	-31.00 1 02	-31.00 1 05
-32.00 41 426	-32.00 0 73	-32.00 0 93	-32.00 1 05	-32.00 1 08
-33.00 42 430	-33.00 0 76	-33.00 0 96	-33.00 1 08	-33.00 1 11
-34.00 43 434	-34.00 0 79	-34.00 0 99	-34.00 1 11	-34.00 1 14
-35.00 44 438	-35.00 0 82	-35.00 1 02	-35.00 1 14	-35.00 1 17
-36.00 45 442	-36.00 0 85	-36.00 1 05	-36.00 1 17	-36.00 1 20
-37.00 46 446	-37.00 0 88	-37.00 1 08	-37.00 1 20	-37.00 1 23
-38.00 47 450	-38.00 0 91	-38.00 1 11	-38.00 1 23	-38.00 1 26
-39.00 48 454	-39.00 0 94	-39.00 1 14	-39.00 1 26	-39.00 1 29
-40.00 49 458	-40.00 0 97	-40.00 1 17	-40.00 1 29	-40.00 1 32
-41.00 50 462	-41.00 0 100	-41.00 1 20	-41.00 1 32	-41.00 1 35
-42.00 51 466	-42.00 0 103	-42.00 1 23	-42.00 1 35	-42.00 1 38
-43.00 52 470	-43.00 0 106	-43.00 1 26	-43.00 1 38	-43.00 1 41
-44.00 53 474	-44.00 0 109	-44.00 1 29	-44.00 1 41	-44.00 1 44
-45.00 54 478	-45.00 0 112	-45.00 1 32	-45.00 1 44	-45.00 1 47
-46.00 55 482	-46.00 0 115	-46.00 1 35	-46.00 1 47	-46.00 1 50
-47.00 56 486	-47.00 0 118	-47.00 1 38	-47.00 1 50	-47.00 1 53
-48.00 57 490	-48.00 0 121	-48.00 1 41	-48.00 1 53	-48.00 1 56
-49.00 58 494	-49.00 0 124	-49.00 1 44	-49.00 1 56	-49.00 1 59
-50.00 59 498	-50.00 0 127	-50.00 1 47	-50.00 1 59	-50.00 1 62
-51.00 60 502	-51.00 0 130	-51.00 1 50	-51.00 1 62	-51.00 1 65
-52.00 61 506	-52.00 0 133	-52.00 1 53	-52.00 1 65	-52.00 1 68
-53.00 62 510	-53.00 0 136	-53.00 1 56	-53.00 1 68	-53.00 1 71
-54.00 63 514	-54.00 0 139	-54.00 1 59	-54.00 1 71	-54.00 1 74
-55.00 64 518	-55.00 0 142	-55.00 1 62	-55.00 1 74	-55.00 1 77
-56.00 65 522	-56.00 0 145	-56.00 1 65	-56.00 1 77	-56.00 1 80
-57.00 66 526	-57.00 0 148	-57.00 1 68	-57.00 1 80	-57.00 1 83
-58.00 67 530	-58.00 0 151	-58.00 1 71	-58.00 1 83	-58.00 1 86
-59.00 68 534	-59.00 0 154	-59.00 1 74	-59.00 1 86	-59.00 1 89
-60.00 69 538	-60.00 0 157	-60.00 1 77	-60.00 1 89	-60.00 1 92
-61.00 70 542	-61.00 0 160	-61.00 1 80	-61.00 1 92	-61.00 1 95
-62.00 71 546	-62.00 0 163	-62.00 1 83	-62.00 1 95	-62.00 1 98
-63.00 72 550	-63.00 0 166	-63.00 1 86	-63.00 1 98	-63.00 2 01
-64.00 73 554	-64.00 0 169	-64.00 1 89	-64.00 2 01	-64.00 2 04
-65.00 74 558	-65.00 0 172	-65.00 1 92	-65.00 2 04	-65.00 2 07
-66.00 75 562	-66.00 0 175	-66.00 1 95	-66.00 2 07	-66.00 2 10
-67.00 76 566	-67.00 0 178	-67.00 1 98	-67.00 2 10	-67.00 2 13
-68.00 77 570	-68.00 0 181	-68.00 2 01	-68.00 2 13	-68.00 2 16
-69.00 78 574	-69.00 0 184	-69.00 2 04	-69.00 2 16	-69.00 2 19
-70.00 79 578	-70.00 0 187	-70.00 2 07	-70.00 2 19	-70.00 2 22
-71.00 80 582	-71.00 0 190	-71.00 2 10	-71.00 2 22	-71.00 2 25
-72.00 81 586	-72.00 0 193	-72.00 2 13	-72.00 2 25	-72.00 2 28
-73.00 82 590	-73.00 0 196	-73.00 2 16	-73.00 2 28	-73.00 2 31
-74.00 83 594	-74.00 0 199	-74.00 2 19	-74.00 2 31	-74.00 2 34
-75.00 84 598	-75.00 0 202	-75.00 2 22	-75.00 2 34	-75.00 2 37
-76.00 85 602	-76.00 0 205	-76.00 2 25	-76.00 2 37	-76.00 2 40
-77.00 86 606	-77.00 0 208	-77.00 2 28	-77.00 2 40	-77.00 2 43
-78.00 87 610	-78.00 0 211	-78.00 2 31	-78.00 2 43	-78.00 2 46
-79.00 88 614	-79.00 0 214	-79.00 2 34	-79.00 2 46	-79.00 2 49
-80.00 89 618	-80.00 0 217	-80.00 2 37	-80.00 2 49	-80.00 2 52
-81.00 90 622	-81.00 0 220	-81.00 2 40	-81.00 2 52	-81.00 2 55
-82.00 91 626	-82.00 0 223	-82.00 2 43	-82.00 2 55	-82.00 2 58
-83.00 92 630	-83.00 0 226	-83.00 2 46	-83.00 2 58	-83.00 3 01
-84.00 93 634	-84.00 0 229	-84.00 2 49	-84.00 3 01	-84.00 3 04
-85.00 94 638	-85.00 0 232	-85.00 2 52	-85.00 3 04	-85.00 3 07
-86.00 95 642	-86.00 0 235	-86.00 2 55	-86.00 3 07	-86.00 3 10
-87.00 96 646	-87.00 0 238	-87.00 2 58	-87.00 3 10	-87.00 3 13
-88.00 97 650	-88.00 0 241	-88.00 3 01	-88.00 3 13	-88.00 3 16
-89.00 98 654	-89.00 0 244	-89.00 3 04	-89.00 3 16	-89.00 3 19
-90.00 99 658	-90.00 0 247	-90.00 3 07	-90.00 3 19	-90.00 3 22
-91.00 100 662	-91.00 0 250	-91.00 3 10	-91.00 3 22	-91.00 3 25
-92.00 101 666	-92.00 0 253	-92.00 3 13	-92.00 3 25	-92.00 3 28
-93.00 102 670	-93.00 0 256	-93.00 3 16	-93.00 3 28	-93.00 3 31
-94.00 103 674	-94.00 0 259	-94.00 3 19	-94.00 3 31	-94.00 3 34
-95.00 104 678	-95.00 0 262	-95.00 3 22	-95.00 3 34	-95.00 3 37
-96.00 105 682	-96.00 0 265	-96.00 3 25	-96.00 3 37	-96.00 3 40
-97.00 106 686	-97.00 0 268	-97.00 3 28	-97.00 3 40	-97.00 3 43
-98.00 107 690	-98.00 0 271	-98.00 3 31	-98.00 3 43	-98.00 3 46
-99.00 108 694	-99.00 0 274	-99.00 3 34	-99.00 3 46	-99.00 3 49
-100.00 109 698	-100.00 0 277	-100.00 3 37	-100.00 3 49	-100.00 3 52

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -40.00 LONG. = 270.00	GEOGRAPHIC LAT. = -40.00 LONG. = 285.00	GEOGRAPHIC LAT. = -40.00 LONG. = 300.00	GEOGRAPHIC LAT. = -40.00 LONG. = 315.00	GEOGRAPHIC LAT. = -40.00 LONG. = 330.00	GEOGRAPHIC LAT. = -40.00 LONG. = 345.00
RIC ASYMPTOTIC (CV) LAT LONG	RIC ASYMPTOTIC (CV) LAT LONG	RIC ASYMPTOTIC (CV) LAT LONG	RIC ASYMPTOTIC (CV) LAT LONG	RIC ASYMPTOTIC (CV) LAT LONG	RIC ASYMPTOTIC (CV) LAT LONG
20.00 -7 -17	20.00 -6 -7	20.00 -4 -2	20.00 -2 -9	20.00 -2 -17	20.00 -3 -26
19.00 -4 -16	19.00 -2 -6	19.00 -1 -4	19.00 0 -11	19.00 0 -19	18.00 -1 -20
18.00 0 -11	18.00 1 -1	18.00 3 7	18.00 4 14	18.00 5 21	17.00 8 31
17.00 4 -7	17.00 6 3	17.00 7 10	17.00 7 16	17.00 7 23	16.00 8 33
16.00 9 -2	16.00 11 7	16.00 11 14	16.00 11 20	16.00 10 25	15.00 12 35
15.00 15 4	15.00 15 13	15.00 16 19	15.00 16 24	15.00 14 29	14.00 16 38
14.00 21 13	14.00 22 22	14.00 22 27	14.00 21 29	14.00 19 33	13.00 21 42
13.00 25 27	13.00 27 35	13.00 27 37	13.00 26 37	13.00 24 38	12.00 25 47
12.00 29 58	12.00 29 56	12.00 30 54	12.00 30 49	12.00 28 46	11.00 30 54
11.00 24 53	11.00 24 59	11.00 24 79	11.00 31 67	11.00 32 56	10.00 33 64
11.00 23 56	11.00 27 61	10.00 -8 123	10.00 19 92	10.00 31 74	9.00 32 79
11.00 22 60	11.00 26 64	9.00 -16 143	9.00 -16 143	9.00 19 96	8.00 23 95
11.00 21 63	11.00 25 67	9.00 -16 147	9.00 -16 157	8.00 -10 129	7.00 24 115
11.00 19 67	11.00 24 71	9.00 -11 173	8.00 -8 178	7.00 -13 135	6.00 2 118
11.00 17 70	11.00 22 76	9.00 -10 172	8.00 16 217	7.00 -16 144	5.00 8 126
11.00 15 74	11.00 21 77	9.00 -8 175	8.00 18 225	7.00 -16 154	4.00 -3 124
11.00 12 79	11.00 21 81	9.00 -7 179	8.00 19 235	7.00 -13 160	3.00 -5 127
11.00 9 84	11.00 16 83	9.00 -4 182	8.00 16 248	7.00 -3 187	2.00 -9 131
11.00 6 89	11.00 15 89	9.00 -2 186	8.00 16 264	7.00 16 220	1.00 -10 136
10.00 2 95	11.00 10 94	9.00 1 190	8.00 -18 286	7.00 -7 181	0.00 -12 141
10.00 -3 103	10.00 6 99	9.00 1 194	8.00 1 194	7.00 -4 207	0.00 -13 146
10.00 -7 112	10.00 1 104	9.00 7 200	8.00 7 200	7.00 -15 163	0.00 -13 156
10.00 -10 126	10.00 -4 112	9.00 11 206	8.00 11 206	7.00 -7 173	0.00 -12 166
10.00 -10 147	10.00 -1 121	9.00 14 213	8.00 14 213	6.00 -5 168	0.00 -9 179
10.00 -7 166	10.00 -13 134	9.00 17 223	8.00 17 223	6.00 -9 193	0.00 -11 197
10.00 10 196	10.00 -13 155	9.00 18 236	8.00 18 236	6.00 -22 266	0.00 11 238
10.00 13 206	10.00 4 192	9.00 11 254	8.00 11 254	6.00 -24 250	0.00 12 238
10.00 16 220	10.00 8 199	9.00 -6 279	8.00 -6 279	6.00 -23 243	0.00 12 242
10.00 13 240	10.00 12 207	9.00 5 285	8.00 5 285	6.00 -23 241	0.00 12 250
10.00 9 275	10.00 16 218	9.00 17 233	8.00 17 233	6.00 -23 246	0.00 12 259
10.00 -2 376	10.00 17 233	9.00 20 253	8.00 20 253	6.00 -23 252	0.00 12 266
10.00 -9 376	10.00 18 253	9.00 23 266	8.00 23 266	6.00 -22 269	0.00 12 271
10.00 -16 376	10.00 19 266	9.00 26 286	8.00 26 286	6.00 -22 286	0.00 12 286
10.00 -23 376	10.00 20 286	9.00 29 306	8.00 29 306	6.00 -22 306	0.00 12 312
10.00 -30 376	10.00 21 306	9.00 32 326	8.00 32 326	6.00 -22 326	0.00 12 326

TABLE A1 (CONTINUED)

ASTROPHYSIC DIRECTIONS FOR WORK - GRID LOCATIONS
 WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IGRF 1975.0)

[illegible]

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -45.00 LONG. = 90.00			GEOGRAPHIC LAT. = -45.00 LONG. = 105.00			GEOGRAPHIC LAT. = -45.00 LONG. = 120.00			GEOGRAPHIC LAT. = -45.00 LONG. = 135.00			GEOGRAPHIC LAT. = -45.00 LONG. = 150.00			GEOGRAPHIC LAT. = -45.00 LONG. = 165.00		
RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC	
(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG
10.00	-3	109	11.00	-6	129	10.00	-8	169	10.00	-6	171	10.00	-6	193	10.00	-4	217
9.00	-3	111	9.00	-6	130	9.00	-7	151	9.00	-7	172	9.00	-6	195	9.00	-3	218
8.00	-1	114	8.00	-4	133	8.00	-4	153	8.00	-6	175	8.00	-5	198	8.00	-3	222
7.00	3	117	7.00	0	136	7.00	-2	157	7.00	-2	179	7.00	-2	203	7.00	0	228
6.00	10	121	6.00	6	139	6.00	4	160	6.00	4	184	6.00	4	209	6.00	6	237
5.00	16	123	5.00	11	141	5.00	8	162	5.00	8	186	5.00	8	214	5.00	11	246
4.00	18	130	4.00	14	146	4.00	12	169	4.00	11	194	4.00	11	223	4.00	10	258
3.00	27	135	3.00	22	159	3.00	18	181	3.00	16	204	3.00	13	242	3.00	10	288
2.00	26	147	2.00	22	161	2.00	19	183	2.00	16	211	2.00	12	246	2.00	-1	296
2.00	26	158	2.00	22	163	2.00	19	185	2.00	17	214	2.00	12	250	2.00	-3	301
2.70	27	153	2.70	23	166	2.70	20	188	2.70	17	217	2.70	11	254	2.70	-6	308
2.60	27	157	2.60	24	169	2.60	21	191	2.60	18	221	2.60	10	260	2.60	-11	319
2.50	28	162	2.50	25	173	2.50	22	194	2.50	18	225	2.50	8	266	2.50	-17	336
2.40	28	167	2.40	25	176	2.40	22	197	2.40	17	228	2.40	5	271	2.40	-22	367
2.30	27	171	2.30	23	178	2.30	21	199	2.30	16	231	2.30	2	275	2.30	-3	402
2.20	25	174	2.20	24	181	2.20	21	202	2.20	14	234	2.20	-1	280	2.20	3	495
2.10	23	178	2.10	24	186	2.10	20	206	2.10	13	240	2.10	-5	289	2.10	0	667
2.00	21	185	2.00	23	192	2.00	19	214	2.00	10	248	2.00	-14	304	2.00	12	443
1.90	16	194	1.90	21	199	1.90	17	219	1.90	6	254	1.90	-23	326	1.90	-4	815
1.80	9	203	1.80	16	209	1.80	14	224	1.80	-5	271	1.80	-23	355	1.80	-2	578
1.70	-2	210	1.70	13	210	1.70	11	232	1.70	-5	271	1.70	14	848	1.70	-7	673
1.60	-8	224	1.60	8	221	1.60	3	242	1.60	-14	289	1.60	14	863	1.60	-19	708
1.50	-26	261	1.50	-1	238	1.50	-4	251	1.50	-26	313	1.50	15	444	1.50	7	546
1.40	18	401	1.40	-13	246	1.40	-18	276	1.40	21	461	1.40	16	461	1.40	2.12	R
1.30	17	594	1.30	-23	292	1.30	-28	312	1.30	17	512	1.30	12	1198	1.30	7	565
1.30	11	448	1.20	-27	299	1.20	-27	318	1.20	14	429	1.20	1.64	R	1.20	7	827
1.37	-1	407	1.20	-25	306	1.20	-25	326	1.37	2	448	1.64	R	R	1.64	R	R
1.36	-8	388	1.27	-22	314	1.27	-21	335	1.36	1	976	1.64	R	R	1.64	R	R
1.35	6	515	1.25	-17	324	1.26	-14	346	1.35	-12	652	1.64	R	R	1.64	R	R
1.34	R	R	1.25	-8	337	1.25	-1	362	1.34	R	R	1.64	R	R	1.64	R	R
			1.24	7	359	1.24	21	462				1.64	R	R	1.64	R	R
			1.23	-1	475	1.23	3	600				1.64	R	R	1.64	R	R
			1.22	12	431	1.22	9	488				1.64	R	R	1.64	R	R
			1.21	-1	527	1.21	8	842				1.64	R	R	1.64	R	R
			1.20	10	542	1.20	-8	573				1.64	R	R	1.64	R	R
			1.19	9	545	1.19	-5	534				1.64	R	R	1.64	R	R
			1.18	R	R	1.18	R	R				1.64	R	R	1.64	R	R

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR MDR-1 GAIT LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOMAGNETIC LAT. \pm 50.00 LONG. \pm 0.00	GEOMAGNETIC LAT. \pm 50.00 LONG. \pm 15.00	GEOMAGNETIC LAT. \pm 50.00 LONG. \pm 30.00	GEOMAGNETIC LAT. \pm 50.00 LONG. \pm 45.00	GEOMAGNETIC LAT. \pm 50.00 LONG. \pm 60.00	GEOMAGNETIC LAT. \pm 50.00 LONG. \pm 75.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
20.00 -13 33	21.50 -13 44	20.00 -13 56	20.00 -12 66	20.00 -14 77	20.00 -18 99
19.00 -11 34	13.00 -11 45	19.00 -11 56	19.00 -11 66	19.00 -12 77	19.00 -16 88
18.00 -9 34	13.00 -11 45	18.00 -9 56	18.00 -9 66	18.00 -11 76	18.00 -15 88
17.00 -6 34	17.00 -6 45	17.00 -6 56	17.00 -7 66	17.00 -9 76	17.00 -14 87
16.00 -3 35	13.00 -7 45	16.00 -4 56	16.00 -5 66	16.00 -6 75	16.00 -13 87
15.00 0 35	13.00 -11 46	15.00 -1 56	15.00 -2 65	15.00 -3 75	15.00 -12 86
14.00 4 36	14.00 7 46	14.00 1 56	14.00 2 65	14.00 3 74	14.00 -11 85
13.00 8 36	14.00 7 46	13.00 4 55	13.00 2 64	13.00 -4 73	13.00 -10 85
12.00 12 37	12.00 11 46	12.00 7 55	12.00 4 63	12.00 -2 72	12.00 -10 84
11.00 16 38	11.00 13 46	11.00 10 55	11.00 5 61	11.00 -1 72	11.00 -10 84
10.00 20 39	11.00 15 46	10.00 12 54	10.00 6 62	10.00 -2 72	10.00 -10 84
9.00 23 40	9.00 17 47	9.00 15 54	9.00 7 62	9.00 -2 72	9.00 -10 84
8.00 25 41	8.00 19 48	8.00 17 53	8.00 8 63	8.00 -2 74	8.00 -10 84
7.00 27 42	7.00 21 49	7.00 19 53	7.00 9 63	7.00 -2 74	7.00 -10 84
6.00 29 43	6.00 23 50	6.00 21 54	6.00 10 63	6.00 -2 74	6.00 -10 84
5.00 31 44	5.00 25 51	5.00 23 55	5.00 11 63	5.00 -2 74	5.00 -10 84
4.00 33 45	4.00 27 52	4.00 25 56	4.00 12 63	4.00 -2 74	4.00 -10 84
3.00 35 46	3.00 29 53	3.00 27 57	3.00 13 63	3.00 -2 74	3.00 -10 84
2.00 37 47	2.00 31 54	2.00 29 58	2.00 14 63	2.00 -2 74	2.00 -10 84
1.00 39 48	1.00 33 55	1.00 31 59	1.00 15 63	1.00 -2 74	1.00 -10 84
0.00 41 49	0.00 35 56	0.00 33 60	0.00 16 63	0.00 -2 74	0.00 -10 84
-1.00 43 50	-1.00 37 57	-1.00 35 61	-1.00 17 63	-1.00 -2 74	-1.00 -10 84
-2.00 45 51	-2.00 39 58	-2.00 37 62	-2.00 18 63	-2.00 -2 74	-2.00 -10 84
-3.00 47 52	-3.00 41 59	-3.00 39 63	-3.00 19 63	-3.00 -2 74	-3.00 -10 84
-4.00 49 53	-4.00 43 60	-4.00 41 64	-4.00 20 63	-4.00 -2 74	-4.00 -10 84
-5.00 51 54	-5.00 45 61	-5.00 43 65	-5.00 21 63	-5.00 -2 74	-5.00 -10 84
-6.00 53 55	-6.00 47 62	-6.00 45 66	-6.00 22 63	-6.00 -2 74	-6.00 -10 84
-7.00 55 56	-7.00 49 63	-7.00 47 67	-7.00 23 63	-7.00 -2 74	-7.00 -10 84
-8.00 57 57	-8.00 51 64	-8.00 49 68	-8.00 24 63	-8.00 -2 74	-8.00 -10 84
-9.00 59 58	-9.00 53 65	-9.00 51 69	-9.00 25 63	-9.00 -2 74	-9.00 -10 84
-10.00 61 59	-10.00 55 66	-10.00 53 70	-10.00 26 63	-10.00 -2 74	-10.00 -10 84
-11.00 63 60	-11.00 57 67	-11.00 55 71	-11.00 27 63	-11.00 -2 74	-11.00 -10 84
-12.00 65 61	-12.00 59 68	-12.00 57 72	-12.00 28 63	-12.00 -2 74	-12.00 -10 84
-13.00 67 62	-13.00 61 69	-13.00 59 73	-13.00 29 63	-13.00 -2 74	-13.00 -10 84
-14.00 69 63	-14.00 63 70	-14.00 61 74	-14.00 30 63	-14.00 -2 74	-14.00 -10 84
-15.00 71 64	-15.00 65 71	-15.00 63 75	-15.00 31 63	-15.00 -2 74	-15.00 -10 84
-16.00 73 65	-16.00 67 72	-16.00 65 76	-16.00 32 63	-16.00 -2 74	-16.00 -10 84
-17.00 75 66	-17.00 69 73	-17.00 67 77	-17.00 33 63	-17.00 -2 74	-17.00 -10 84
-18.00 77 67	-18.00 71 74	-18.00 69 78	-18.00 34 63	-18.00 -2 74	-18.00 -10 84
-19.00 79 68	-19.00 73 75	-19.00 71 79	-19.00 35 63	-19.00 -2 74	-19.00 -10 84
-20.00 81 69	-20.00 75 76	-20.00 73 80	-20.00 36 63	-20.00 -2 74	-20.00 -10 84
-21.00 83 70	-21.00 77 77	-21.00 75 81	-21.00 37 63	-21.00 -2 74	-21.00 -10 84
-22.00 85 71	-22.00 79 78	-22.00 77 82	-22.00 38 63	-22.00 -2 74	-22.00 -10 84
-23.00 87 72	-23.00 81 79	-23.00 79 83	-23.00 39 63	-23.00 -2 74	-23.00 -10 84
-24.00 89 73	-24.00 83 80	-24.00 81 84	-24.00 40 63	-24.00 -2 74	-24.00 -10 84
-25.00 91 74	-25.00 85 81	-25.00 83 85	-25.00 41 63	-25.00 -2 74	-25.00 -10 84
-26.00 93 75	-26.00 87 82	-26.00 85 86	-26.00 42 63	-26.00 -2 74	-26.00 -10 84
-27.00 95 76	-27.00 89 83	-27.00 87 87	-27.00 43 63	-27.00 -2 74	-27.00 -10 84
-28.00 97 77	-28.00 91 84	-28.00 89 88	-28.00 44 63	-28.00 -2 74	-28.00 -10 84
-29.00 99 78	-29.00 93 85	-29.00 91 89	-29.00 45 63	-29.00 -2 74	-29.00 -10 84
-30.00 101 79	-30.00 95 86	-30.00 93 90	-30.00 46 63	-30.00 -2 74	-30.00 -10 84
-31.00 103 80	-31.00 97 87	-31.00 95 91	-31.00 47 63	-31.00 -2 74	-31.00 -10 84
-32.00 105 81	-32.00 99 88	-32.00 97 92	-32.00 48 63	-32.00 -2 74	-32.00 -10 84
-33.00 107 82	-33.00 101 89	-33.00 99 93	-33.00 49 63	-33.00 -2 74	-33.00 -10 84
-34.00 109 83	-34.00 103 90	-34.00 101 94	-34.00 50 63	-34.00 -2 74	-34.00 -10 84
-35.00 111 84	-35.00 105 91	-35.00 103 95	-35.00 51 63	-35.00 -2 74	-35.00 -10 84
-36.00 113 85	-36.00 107 92	-36.00 105 96	-36.00 52 63	-36.00 -2 74	-36.00 -10 84
-37.00 115 86	-37.00 109 93	-37.00 107 97	-37.00 53 63	-37.00 -2 74	-37.00 -10 84
-38.00 117 87	-38.00 111 94	-38.00 109 98	-38.00 54 63	-38.00 -2 74	-38.00 -10 84
-39.00 119 88	-39.00 113 95	-39.00 111 99	-39.00 55 63	-39.00 -2 74	-39.00 -10 84
-40.00 121 89	-40.00 115 96	-40.00 113 100	-40.00 56 63	-40.00 -2 74	-40.00 -10 84
-41.00 123 90	-41.00 117 97	-41.00 115 101	-41.00 57 63	-41.00 -2 74	-41.00 -10 84
-42.00 125 91	-42.00 119 98	-42.00 117 102	-42.00 58 63	-42.00 -2 74	-42.00 -10 84
-43.00 127 92	-43.00 121 99	-43.00 119 103	-43.00 59 63	-43.00 -2 74	-43.00 -10 84
-44.00 129 93	-44.00 123 100	-44.00 121 104	-44.00 60 63	-44.00 -2 74	-44.00 -10 84
-45.00 131 94	-45.00 125 101	-45.00 123 105	-45.00 61 63	-45.00 -2 74	-45.00 -10 84
-46.00 133 95	-46.00 127 102	-46.00 125 106	-46.00 62 63	-46.00 -2 74	-46.00 -10 84
-47.00 135 96	-47.00 129 103	-47.00 127 107	-47.00 63 63	-47.00 -2 74	-47.00 -10 84
-48.00 137 97	-48.00 131 104	-48.00 129 108	-48.00 64 63	-48.00 -2 74	-48.00 -10 84
-49.00 139 98	-49.00 133 105	-49.00 131 109	-49.00 65 63	-49.00 -2 74	-49.00 -10 84
-50.00 141 99	-50.00 135 106	-50.00 133 110	-50.00 66 63	-50.00 -2 74	-50.00 -10 84
-51.00 143 100	-51.00 137 107	-51.00 135 111	-51.00 67 63	-51.00 -2 74	-51.00 -10 84
-52.00 145 101	-52.00 139 108	-52.00 137 112	-52.00 68 63	-52.00 -2 74	-52.00 -10 84
-53.00 147 102	-53.00 141 109	-53.00 139 113	-53.00 69 63	-53.00 -2 74	-53.00 -10 84
-54.00 149 103	-54.00 143 110	-54.00 141 114	-54.00 70 63	-54.00 -2 74	-54.00 -10 84
-55.00 151 104	-55.00 145 111	-55.00 143 115	-55.00 71 63	-55.00 -2 74	-55.00 -10 84
-56.00 153 105	-56.00 147 112	-56.00 145 116	-56.00 72 63	-56.00 -2 74	-56.00 -10 84
-57.00 155 106	-57.00 149 113	-57.00 147 117	-57.00 73 63	-57.00 -2 74	-57.00 -10 84
-58.00 157 107	-58.00 151 114	-58.00 149 118	-58.00 74 63	-58.00 -2 74	-58.00 -10 84
-59.00 159 108	-59.00 153 115	-59.00 151 119	-59.00 75 63	-59.00 -2 74	-59.00 -10 84
-60.00 161 109	-60.00 155 116	-60.00 153 120	-60.00 76 63	-60.00 -2 74	-60.00 -10 84
-61.00 163 110	-61.00 157 117	-61.00 155 121	-61.00 77 63	-61.00 -2 74	-61.00 -10 84
-62.00 165 111	-62.00 159 118	-62.00 157 122	-62.00 78 63	-62.00 -2 74	-62.00 -10 84
-63.00 167 112	-63.00 161 119	-63.00 159 123	-63.00 79 63	-63.00 -2 74	-63.00 -10 84
-64.00 169 113	-64.00 163 120	-64.00 161 124	-64.00 80 63	-64.00 -2 74	-64.00 -10 84
-65.00 171 114	-65.00 165 121	-65.00 163 125	-65.00 81 63	-65.00 -2 74	-65.00 -10 84
-66.00 173 115	-66.00 167 122	-66.00 165 126	-66.00 82 63	-66.00 -2 74	-66.00 -10 84
-67.00 175 116	-67.00 169 123	-67.00 167 127	-67.00 83 63	-67.00 -2 74	-67.00 -10 84
-68.00 177 117	-68.00 171 124	-68.00 169 128	-68.00 84 63	-68.00 -2 74	-68.00 -10 84
-69.00 179 118	-69.00 173 125	-69.00 171 129	-69.00 85 63	-69.00 -2 74	-69.00 -10 84
-70.00 181 119	-70.00 175 126	-70.00 173 130	-70.00 86 63	-70.00 -2 74	-70.00 -10 84
-71.00 183 120	-71.00 177 127	-71.00 175 131	-71.00 87 63	-71.00 -2 74	-71.00 -10 84
-72.00 185 121	-72.00 179 128	-72.00 177 132	-72.00 88 63	-72.00 -2 74	-72.00 -10 84
-73.00 187 122	-73.00 181 129	-73.00 179 133	-73.00 89 63	-73.00 -2 74	-73.00 -10 84
-74.00 189 123	-74.00 183 130	-74.00 181 134	-74.00 90 63	-74.00 -2 74	-74.00 -10 84
-75.00 191 124	-75.00 185 131	-75.00 183 135	-75.00 91 63	-75.00 -2 74	-75.00 -10 84
-76.00 193 125	-76.00 187 132	-76.00 185 136	-76.00 92 63	-76.00 -2 74	-76.00 -10 84
-77.00 195 126	-77.00 189 133	-77.00 187 137	-77.00 93 63	-77.00 -2 74	-77.00 -10 84
-78.00 197 127	-78.00 191 134	-78.00 189 138	-78.00 94 63	-78.00 -2 74	-78.00 -10 84
-79.00 199 128	-79.00 193 135	-79.00 191 139	-79.00 95 63	-79.00 -2 74	-79.00 -10 84
-80.00 201 129	-80.00 195 136	-80.00 193 140	-80.00 96 63	-80.00 -2 74	-80.00 -10 84
-81.00 203 130	-81.00 197 137	-81.00 195 141	-81.00 97 63	-81.00 -2 74	-81.00 -10 84
-82.00 205 131	-82.00 199 138	-82.00 197 142	-82.00 98 63	-82.00 -2 74	-82.00 -10 84
-83.00 207 132	-83.00 201 139	-83.00 199 143	-83.00 99 63	-83.00 -2 74	-83.00 -10 84
-84.00 209 133	-84.00 203 140	-84.00 201 144	-84.00 100 63	-84.00 -2 74	-84.00 -10 84
-85.00 211 134	-85.00 205 141	-85.00 203 145	-85.00 101 63	-85.00 -2 74	-85.00 -10 84
-86.00 213 135	-86.00 207 142	-86.00 205 146	-86.00 102 63	-86.00 -2 74	-86.00 -10 84
-87.00 215 136	-87.00 209 143	-87.00 207 147	-87.00 103 63	-87.00 -2 74	-87.00 -10 84
-88.00 217 137	-88.00 211 144	-88.00 209 148	-88.00 104 63	-88.00 -2 74	-88.00 -10 84
-89.00 219 138	-89.00 213 145	-89.00 211 149	-89.00 105 63	-89.00 -2 74	-89.00 -10 84
-90.00 221 139	-90.00 215 146	-90.00 213 150	-90.00 106 63	-90.00 -2 74	-90.00 -10 84
-91.00 223 140	-91.00 217 147	-91.00 215 151	-91.00 107 63	-91.00 -2 74	-91.00 -10 84
-92.00 225 141	-92.00 219 148	-92.00 217 152	-92.00 108 63	-92.00 -2 74	-92.00 -10 84
-93.00 227 142	-93.00 221 149	-93.00 219 153	-93.00 109 63	-93.00 -2 74	-93.00 -10 84
-94.00 229 143	-94.00 223 150	-94.00 221 154	-94.00 110 63	-94.00 -2 74	-94.00 -10 84
-95.00 231 144	-95.00 225 151	-95.00 223 155	-95.00 111 63	-95.00 -2 74	-95.00 -10 84
-96.00 233 145	-96.00 227 152	-96.00 225 156	-96.00 1		

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = -90.00 LONG. = 90.00		LAT. = -50.00 LONG. = 105.00		LAT. = -50.00 LONG. = 120.00		LAT. = -50.00 LONG. = 135.00		LAT. = -50.00 LONG. = 150.00		LAT. = -50.00 LONG. = 165.00	
RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG
28.00	-22 104	23.00	-27 122	19.00	-29 143	20.00	-32 165	20.00	-32 167	20.00	-31 289
19.00	-22 104	13.00	-26 122	18.00	-28 143	19.00	-30 165	19.00	-31 187	19.00	-30 209
18.00	-21 103	11.00	-25 122	17.00	-27 143	18.00	-29 165	18.00	-29 187	18.00	-28 209
17.00	-20 103	10.00	-24 122	16.00	-26 143	17.00	-28 165	17.00	-28 187	17.00	-26 218
16.00	-19 102	9.00	-23 121	15.00	-25 142	16.00	-27 165	16.00	-26 187	16.00	-25 218
15.00	-18 102	8.00	-22 121	14.00	-24 142	15.00	-26 165	15.00	-25 187	15.00	-23 218
14.00	-17 101	7.00	-21 121	13.00	-23 142	14.00	-25 164	14.00	-24 187	14.00	-21 209
13.00	-17 101	6.00	-20 120	12.00	-22 142	13.00	-24 164	13.00	-23 187	13.00	-20 209
12.00	-16 101	5.00	-19 120	11.00	-21 142	12.00	-23 164	12.00	-22 186	12.00	-18 209
11.00	-16 101	4.00	-18 121	10.00	-20 143	11.00	-22 164	11.00	-21 186	11.00	-17 209
10.00	-15 102	3.00	-17 121	9.00	-19 144	10.00	-21 164	10.00	-20 187	10.00	-17 189
9.00	-15 103	2.00	-16 123	8.00	-18 146	9.00	-20 166	9.00	-19 188	9.00	-16 211
8.00	-14 103	1.00	-15 123	7.00	-17 148	8.00	-19 168	8.00	-18 191	8.00	-16 213
7.00	-13 103	0.00	-14 123	6.00	-16 149	7.00	-18 171	7.00	-17 194	7.00	-15 218
6.00	-13 103	0.00	-13 127	5.00	-15 149	6.00	-17 172	6.00	-16 197	6.00	-15 222
5.00	-12 108	0.00	-12 127	4.00	-14 153	5.00	-16 173	5.00	-15 198	5.00	-14 225
4.00	-12 112	0.00	-11 131	3.00	-13 157	4.00	-15 177	4.00	-14 204	4.00	-13 231
3.00	-12 116	0.00	-10 134	2.00	-12 167	3.00	-14 182	3.00	-13 210	3.00	-12 244
2.00	-12 131	0.00	-9 143	1.00	-11 168	2.00	-13 185	2.00	-12 230	2.00	-11 248
1.00	-12 134	0.00	-8 146	0.00	-10 170	1.00	-12 186	1.00	-11 233	1.00	-10 248
0.00	-12 136	0.00	-7 147	0.00	-9 173	0.00	-11 189	0.00	-10 236	0.00	-9 251
1.78	-26 139	1.78	-20 151	1.60	-17 175	1.70	-15 202	1.70	-13 241	2.60	-10 254
1.68	-26 144	1.60	-22 153	1.50	-16 178	1.60	-16 205	1.60	-13 247	2.50	-11 258
1.50	-28 148	1.50	-22 156	1.40	-16 180	1.50	-16 209	1.50	-12 251	2.40	-11 261
1.40	-28 154	1.40	-24 161	1.30	-20 185	1.40	-18 214	1.40	-10 261	2.30	-11 263
1.30	-28 163	1.30	-25 164	1.20	-22 192	1.30	-17 219	1.30	-7 266	2.20	-10 266
1.20	-26 178	1.20	-26 172	1.10	-22 198	1.20	-17 227	1.20	-7 268	2.10	-10 271
1.10	-21 181	1.10	-25 176	1.00	-21 207	1.10	-15 235	1.10	-8 296	2.00	-9 278
1.00	-12 196	1.00	-24 187	0.80	-17 216	1.00	-11 245	1.00	-22 326	1.90	-7 284
0.80	-24 216	0.80	-20 189	0.70	-9 213	0.90	-3 259	0.90	-23 332	1.80	-6 289
0.70	-19 207	0.70	-14 215	0.60	-8 235	0.80	-15 264	0.80	-24 348	1.70	-5 297
0.60	-19 216	0.60	-14 242	0.50	-8 271	0.70	-2 377	0.70	-24 358	1.60	-5 311
0.50	-18 218	0.50	-1 456	0.40	-5 439	0.60	-3 782	0.60	-22 361	1.50	-13 324
0.40	-17 219	0.40	-2 726	0.30	-5 640	0.50	-5 490	0.50	-18 373	1.40	-28 352
0.30	-16 208	0.30	-6 475	0.20	-19 1064	0.40	-7 505	0.40	-7 385	1.30	-26 445
0.20	-13 545	0.20	-15 498	0.10	-56 5 624	0.30	0 883	0.30	-6 399	1.20	-20 497
0.10	-12 522	0.10	-1 748	0.00	-55 14 430	0.20	0 578	0.20	-2 426	1.10	-18 594
0.00	-12 522	0.00	-55 12 819	0.00	-54 15 611	0.10	0 470	0.10	-2 426	1.00	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.90	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.80	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.70	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.60	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.50	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.40	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.30	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.20	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.10	-18 594
0.00	-12 522	0.00	-53 17 368	0.00	-53 12 1170	0.00	0 467	0.00	-2 426	0.00	-18 594

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORKING UNID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC	
(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG	(GV)	LAT	LONG
28.00	-17	31	21.00	-13	42	20.00	-16	52	20.00	-21	77	20.00	-25	83
19.00	-15	31	11.00	-16	42	15.00	-16	52	19.00	-17	61	19.00	-24	88
18.00	-13	32	11.00	-19	42	15.00	-19	52	18.00	-19	71	18.00	-24	88
17.00	-10	32	12.00	-11	42	17.00	-12	51	17.00	-17	70	17.00	-23	81
16.00	-7	32	13.00	-11	41	16.00	-10	51	16.00	-16	69	16.00	-22	80
15.00	-4	31	11.00	-9	41	15.00	-7	50	15.00	-10	59	15.00	-21	73
14.00	-1	31	11.00	-1	40	14.00	-5	49	14.00	-8	58	14.00	-21	73
13.00	2	31	11.00	3	40	13.00	-3	49	13.00	-6	57	13.00	-20	78
12.00	6	31	11.00	5	39	12.00	0	48	12.00	-5	50	12.00	-20	77
11.00	9	30	11.00	5	38	11.00	1	46	11.00	-4	54	11.00	-21	77
10.00	12	30	11.00	4	38	10.00	3	45	10.00	-4	54	10.00	-21	77
9.00	15	30	11.00	4	37	9.00	3	45	9.00	-13	64	9.00	-21	73
8.00	16	30	11.00	4	37	8.00	2	45	8.00	-13	66	8.00	-20	81
7.00	16	32	11.00	1	38	7.00	2	47	7.00	-11	70	7.00	-16	84
6.00	16	37	11.00	1	43	6.00	4	52	6.00	-4	74	6.00	-10	85
5.00	22	49	11.00	13	53	5.00	15	60	5.00	5	73	5.00	-5	83
4.00	31	79	11.00	31	71	4.00	24	61	4.00	18	68	4.00	-4	85
3.98	31	84	11.00	24	61	3.00	24	61	3.00	19	63	3.00	4	87
3.80	30	86	11.00	27	95	2.00	10	87	2.00	28	85	2.00	15	97
3.70	28	91	11.00	27	102	2.00	31	93	2.00	30	80	1.90	18	93
3.68	26	95	11.00	25	111	2.00	32	99	2.00	30	90	1.80	21	101
3.50	23	98	11.00	20	121	2.00	31	105	2.00	30	91	1.70	21	101
3.40	21	100	11.00	13	131	2.00	30	110	2.00	30	92	1.60	22	104
3.30	19	103	11.00	3	142	2.00	27	113	2.00	25	94	1.50	26	103
3.20	17	106	11.00	-7	153	2.00	25	116	2.00	23	97	1.40	27	110
3.10	15	109	11.00	-11	165	2.00	24	119	2.00	20	103	1.30	29	116
3.00	12	114	11.00	-13	184	2.00	21	126	2.00	11	111	1.20	30	121
2.90	9	120	11.00	-13	187	2.00	15	139	2.00	31	120	1.10	31	131
2.80	5	130	11.00	-13	191	2.00	2	157	2.00	26	125	1.00	30	139
2.70	-3	145	11.00	-13	194	1.00	13	179	1.00	25	128	.90	27	151
2.60	-13	178	11.00	-11	198	1.00	-16	206	1.00	21	135	.80	19	169
2.50	1	188	11.00	-12	203	1.00	-15	210	1.00	15	151	.70	-5	196
2.40	-11	208	11.00	-11	208	1.00	-15	214	1.00	-7	166	.60	-7	207
2.30	-18	215	11.00	-10	215	1.00	-14	218	1.00	1	170	.50	15	209
2.20	-22	237	11.00	-7	223	1.00	-13	223	1.00	1	201	.40	15	209
2.10	-24	253	11.00	-4	234	1.00	-11	230	1.00	1	200	.30	15	209
2.00	-24	267	11.00	1	248	1.00	-8	238	1.00	4	200	.20	15	209
1.90	-24	273	11.00	5	273	1.00	-4	249	1.00	4	200	.10	15	209
1.80	-15	347	11.00	15	347	1.00	1	265	1.00	-6	241	.00	15	209
1.70	-3	367	11.00	-3	367	1.00	1	297	1.00	-10	256	.00	15	209
1.60	-15	390	11.00	-15	390	1.00	7	380	1.00	12	256	.00	15	209
1.50	-15	400	11.00	-15	400	1.00	6	416	1.00	12	256	.00	15	209
1.40	-15	416	11.00	-15	416	1.00	4	479	1.00	12	256	.00	15	209
1.30	-21	435	11.00	-21	435	1.00	-21	435	1.00	12	256	.00	15	209
1.20	-21	451	11.00	-21	451	1.00	-21	451	1.00	12	256	.00	15	209
1.10	-21	467	11.00	-21	467	1.00	-21	467	1.00	12	256	.00	15	209
1.00	-21	483	11.00	-21	483	1.00	-21	483	1.00	12	256	.00	15	209
.90	-21	499	11.00	-21	499	1.00	-21	499	1.00	12	256	.00	15	209
.80	-21	515	11.00	-21	515	1.00	-21	515	1.00	12	256	.00	15	209
.70	-21	531	11.00	-21	531	1.00	-21	531	1.00	12	256	.00	15	209
.60	-21	547	11.00	-21	547	1.00	-21	547	1.00	12	256	.00	15	209
.50	-21	563	11.00	-21	563	1.00	-21	563	1.00	12	256	.00	15	209
.40	-21	579	11.00	-21	579	1.00	-21	579	1.00	12	256	.00	15	209
.30	-21	595	11.00	-21	595	1.00	-21	595	1.00	12	256	.00	15	209
.20	-21	611	11.00	-21	611	1.00	-21	611	1.00	12	256	.00	15	209
.10	-21	627	11.00	-21	627	1.00	-21	627	1.00	12	256	.00	15	209
.00	-21	643	11.00	-21	643	1.00	-21	643	1.00	12	256	.00	15	209

TABLE A1 (CONTINUED)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC	
(GV)	(GV)		(GV)	(GV)		(GV)	(GV)		(GV)	(GV)		(GV)	(GV)	
LAT	LONG		LAT	LONG		LAT	LONG		LAT	LONG		LAT	LONG	
20.00	-31	98	21.00	-36	116	20.00	-48	137	20.00	-42	160	20.00	-41	206
19.00	-30	97	20.00	-35	115	19.00	-45	137	19.00	-45	160	19.00	-40	207
18.00	-29	96	19.00	-34	114	18.00	-48	137	18.00	-48	160	18.00	-39	207
17.00	-28	95	18.00	-33	113	17.00	-51	137	17.00	-51	160	17.00	-38	207
16.00	-27	94	17.00	-32	112	16.00	-54	137	16.00	-54	160	16.00	-37	207
15.00	-26	93	16.00	-31	111	15.00	-57	137	15.00	-57	160	15.00	-36	207
14.00	-25	92	15.00	-30	110	14.00	-60	137	14.00	-60	160	14.00	-35	206
13.00	-24	91	14.00	-29	109	13.00	-63	136	13.00	-63	160	13.00	-34	206
12.00	-23	90	13.00	-28	108	12.00	-66	136	12.00	-66	160	12.00	-33	206
11.00	-22	89	12.00	-27	107	11.00	-69	136	11.00	-69	160	11.00	-32	206
10.00	-21	88	11.00	-26	106	10.00	-72	136	10.00	-72	160	10.00	-31	206
9.00	-20	87	10.00	-25	105	9.00	-75	136	9.00	-75	160	9.00	-30	207
8.00	-19	86	9.00	-24	104	8.00	-78	136	8.00	-78	160	8.00	-29	208
7.00	-18	85	8.00	-23	103	7.00	-81	136	7.00	-81	160	7.00	-28	209
6.00	-17	84	7.00	-22	102	6.00	-84	136	6.00	-84	160	6.00	-27	210
5.00	-16	83	6.00	-21	101	5.00	-87	136	5.00	-87	160	5.00	-26	211
4.00	-15	82	5.00	-20	100	4.00	-90	136	4.00	-90	160	4.00	-25	212
3.00	-14	81	4.00	-19	99	3.00	-93	136	3.00	-93	160	3.00	-24	213
2.00	-13	80	3.00	-18	98	2.00	-96	136	2.00	-96	160	2.00	-23	214
1.00	-12	79	2.00	-17	97	1.00	-99	136	1.00	-99	160	1.00	-22	215
0.00	-11	78	1.00	-16	96	0.00	-102	136	0.00	-102	160	0.00	-21	216
-1.00	-10	77	0.00	-15	95	-1.00	-105	136	-1.00	-105	160	-1.00	-20	217
-2.00	-9	76	-1.00	-14	94	-2.00	-108	136	-2.00	-108	160	-2.00	-19	218
-3.00	-8	75	-2.00	-13	93	-3.00	-111	136	-3.00	-111	160	-3.00	-18	219
-4.00	-7	74	-3.00	-12	92	-4.00	-114	136	-4.00	-114	160	-4.00	-17	220
-5.00	-6	73	-4.00	-11	91	-5.00	-117	136	-5.00	-117	160	-5.00	-16	221
-6.00	-5	72	-5.00	-10	90	-6.00	-120	136	-6.00	-120	160	-6.00	-15	222
-7.00	-4	71	-6.00	-9	89	-7.00	-123	136	-7.00	-123	160	-7.00	-14	223
-8.00	-3	70	-7.00	-8	88	-8.00	-126	136	-8.00	-126	160	-8.00	-13	224
-9.00	-2	69	-8.00	-7	87	-9.00	-129	136	-9.00	-129	160	-9.00	-12	225
-10.00	-1	68	-9.00	-6	86	-10.00	-132	136	-10.00	-132	160	-10.00	-11	226
-11.00	0	67	-10.00	-5	85	-11.00	-135	136	-11.00	-135	160	-11.00	-10	227
-12.00	1	66	-11.00	-4	84	-12.00	-138	136	-12.00	-138	160	-12.00	-9	228
-13.00	2	65	-12.00	-3	83	-13.00	-141	136	-13.00	-141	160	-13.00	-8	229
-14.00	3	64	-13.00	-2	82	-14.00	-144	136	-14.00	-144	160	-14.00	-7	230
-15.00	4	63	-14.00	-1	81	-15.00	-147	136	-15.00	-147	160	-15.00	-6	231
-16.00	5	62	-15.00	0	80	-16.00	-150	136	-16.00	-150	160	-16.00	-5	232
-17.00	6	61	-16.00	1	79	-17.00	-153	136	-17.00	-153	160	-17.00	-4	233
-18.00	7	60	-17.00	2	78	-18.00	-156	136	-18.00	-156	160	-18.00	-3	234
-19.00	8	59	-18.00	3	77	-19.00	-159	136	-19.00	-159	160	-19.00	-2	235
-20.00	9	58	-19.00	4	76	-20.00	-162	136	-20.00	-162	160	-20.00	-1	236
-21.00	10	57	-20.00	5	75	-21.00	-165	136	-21.00	-165	160	-21.00	0	237
-22.00	11	56	-21.00	6	74	-22.00	-168	136	-22.00	-168	160	-22.00	1	238
-23.00	12	55	-22.00	7	73	-23.00	-171	136	-23.00	-171	160	-23.00	2	239
-24.00	13	54	-23.00	8	72	-24.00	-174	136	-24.00	-174	160	-24.00	3	240
-25.00	14	53	-24.00	9	71	-25.00	-177	136	-25.00	-177	160	-25.00	4	241
-26.00	15	52	-25.00	10	70	-26.00	-180	136	-26.00	-180	160	-26.00	5	242
-27.00	16	51	-26.00	11	69	-27.00	-183	136	-27.00	-183	160	-27.00	6	243
-28.00	17	50	-27.00	12	68	-28.00	-186	136	-28.00	-186	160	-28.00	7	244
-29.00	18	49	-28.00	13	67	-29.00	-189	136	-29.00	-189	160	-29.00	8	245
-30.00	19	48	-29.00	14	66	-30.00	-192	136	-30.00	-192	160	-30.00	9	246
-31.00	20	47	-30.00	15	65	-31.00	-195	136	-31.00	-195	160	-31.00	10	247
-32.00	21	46	-31.00	16	64	-32.00	-198	136	-32.00	-198	160	-32.00	11	248
-33.00	22	45	-32.00	17	63	-33.00	-201	136	-33.00	-201	160	-33.00	12	249
-34.00	23	44	-33.00	18	62	-34.00	-204	136	-34.00	-204	160	-34.00	13	250
-35.00	24	43	-34.00	19	61	-35.00	-207	136	-35.00	-207	160	-35.00	14	251
-36.00	25	42	-35.00	20	60	-36.00	-210	136	-36.00	-210	160	-36.00	15	252
-37.00	26	41	-36.00	21	59	-37.00	-213	136	-37.00	-213	160	-37.00	16	253
-38.00	27	40	-37.00	22	58	-38.00	-216	136	-38.00	-216	160	-38.00	17	254
-39.00	28	39	-38.00	23	57	-39.00	-219	136	-39.00	-219	160	-39.00	18	255
-40.00	29	38	-39.00	24	56	-40.00	-222	136	-40.00	-222	160	-40.00	19	256
-41.00	30	37	-40.00	25	55	-41.00	-225	136	-41.00	-225	160	-41.00	20	257
-42.00	31	36	-41.00	26	54	-42.00	-228	136	-42.00	-228	160	-42.00	21	258
-43.00	32	35	-42.00	27	53	-43.00	-231	136	-43.00	-231	160	-43.00	22	259
-44.00	33	34	-43.00	28	52	-44.00	-234	136	-44.00	-234	160	-44.00	23	260
-45.00	34	33	-44.00	29	51	-45.00	-237	136	-45.00	-237	160	-45.00	24	261
-46.00	35	32	-45.00	30	50	-46.00	-240	136	-46.00	-240	160	-46.00	25	262
-47.00	36	31	-46.00	31	49	-47.00	-243	136	-47.00	-243	160	-47.00	26	263
-48.00	37	30	-47.00	32	48	-48.00	-246	136	-48.00	-246	160	-48.00	27	264
-49.00	38	29	-48.00	33	47	-49.00	-249	136	-49.00	-249	160	-49.00	28	265
-50.00	39	28	-49.00	34	46	-50.00	-252	136	-50.00	-252	160	-50.00	29	266
-51.00	40	27	-50.00	35	45	-51.00	-255	136	-51.00	-255	160	-51.00	30	267
-52.00	41	26	-51.00	36	44	-52.00	-258	136	-52.00	-258	160	-52.00	31	268
-53.00	42	25	-52.00	37	43	-53.00	-261	136	-53.00	-261	160	-53.00	32	269
-54.00	43	24	-53.00	38	42	-54.00	-264	136	-54.00	-264	160	-54.00	33	270
-55.00	44	23	-54.00	39	41	-55.00	-267	136	-55.00	-267	160	-55.00	34	271
-56.00	45	22	-55.00	40	40	-56.00	-270	136	-56.00	-270	160	-56.00	35	272
-57.00	46	21	-56.00	41	39	-57.00	-273	136	-57.00	-273	160	-57.00	36	273
-58.00	47	20	-57.00	42	38	-58.00	-276	136	-58.00	-276	160	-58.00	37	274
-59.00	48	19	-58.00	43	37	-59.00	-279	136	-59.00	-279	160	-59.00	38	275
-60.00	49	18	-59.00	44	36	-60.00	-282	136	-60.00	-282	160	-60.00	39	276
-61.00	50	17	-60.00	45	35	-61.00	-285	136	-61.00	-285	160	-61.00	40	277
-62.00	51	16	-61.00	46	34	-62.00	-288	136	-62.00	-288	160	-62.00	41	278
-63.00	52	15	-62.00	47	33	-63.00	-291	136	-63.00	-291	160	-63.00	42	279
-64.00	53	14	-63.00	48	32	-64.00	-294	136	-64.00	-294	160	-64.00	43	280
-65.00	54	13	-64.00	49	31	-65.00	-297	136	-65.00	-297	160	-65.00	44	281
-66.00	55	12	-65.00	50	30	-66.00	-300	136	-66.00	-300	160	-66.00	45	282
-67.00	56	11	-66.00	51	29	-67.00	-303	136	-67.00	-303	160	-67.00	46	283
-68.00	57	10	-67.00	52	28	-68.00	-306	136	-68.00	-306	160	-68.00	47	284
-69.00	58	9	-68.00	53	27	-69.00	-309	136	-69.00	-309	160	-69.00	48	285
-70.00	59	8	-69.00	54	26	-70.00	-312	136	-70.00	-312	160	-70.00	49	286
-71.00	60	7	-70.00	55	25	-71.00	-315	136	-71.00	-315	160	-71.00	50	287
-72.00	61	6	-71.00	56	24	-72.00	-318	136	-72.00	-318	160	-72.00	51	288
-73.00	62	5	-72.00	57	23	-73.00	-321	136	-73.00	-321	160	-73.00	52	289
-74.00	63	4	-73.00	58	22	-74.00	-324	136	-74.00	-324	160			

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 55.00 LONG. = 270.00			GEOGRAPHIC LAT. = 55.00 LONG. = 300.00			GEOGRAPHIC LAT. = 55.00 LONG. = 330.00			GEOGRAPHIC LAT. = 55.00 LONG. = 360.00		
RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC	
(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG	
20.00	-20	-24	20.00	-17	-13	20.00	-15	4	20.00	-16	12
19.00	-16	-23	19.00	-14	-12	19.00	-12	4	19.00	-13	13
18.00	-13	-22	18.00	-10	-11	18.00	-9	5	18.00	-10	13
17.00	-9	-21	17.00	-7	-10	17.00	-6	6	17.00	-7	14
16.00	-5	-20	16.00	-2	-9	16.00	-2	7	16.00	-4	14
15.00	0	-19	15.00	1	-8	15.00	2	8	15.00	0	15
14.00	5	-17	14.00	4	-6	14.00	7	9	14.00	4	15
13.00	10	-14	13.00	14	-3	13.00	17	10	13.00	9	16
12.00	16	-11	12.00	20	1	12.00	21	11	12.00	14	17
11.00	21	-6	11.00	25	7	11.00	24	15	11.00	19	18
10.00	25	2	10.00	29	16	10.00	28	20	10.00	23	21
9.00	29	12	9.00	33	30	9.00	31	28	9.00	27	24
8.00	33	24	8.00	37	45	8.00	30	30	8.00	28	29
7.00	37	36	7.00	41	60	7.00	24	49	7.00	27	36
6.00	41	48	6.00	45	75	6.00	16	65	6.00	24	46
5.00	45	60	5.00	49	90	5.00	10	80	5.00	20	60
4.00	49	72	4.00	53	105	4.00	4	95	4.00	16	74
3.00	53	84	3.00	57	120	3.00	-2	110	3.00	12	88
2.00	57	96	2.00	61	135	2.00	-8	125	2.00	8	102
1.00	61	108	1.00	65	150	1.00	-14	140	1.00	4	116
0.00	65	120	0.00	69	165	0.00	-20	155	0.00	0	130
-1.00	69	132	-1.00	73	180	-1.00	-26	170	-1.00	-4	144
-2.00	73	144	-2.00	77	195	-2.00	-32	185	-2.00	-10	158
-3.00	77	156	-3.00	81	210	-3.00	-38	200	-3.00	-16	172
-4.00	81	168	-4.00	85	225	-4.00	-44	215	-4.00	-22	186
-5.00	85	180	-5.00	89	240	-5.00	-50	230	-5.00	-28	200
-6.00	89	192	-6.00	93	255	-6.00	-56	245	-6.00	-34	214
-7.00	93	204	-7.00	97	270	-7.00	-62	260	-7.00	-40	228
-8.00	97	216	-8.00	101	285	-8.00	-68	275	-8.00	-46	242
-9.00	101	228	-9.00	105	300	-9.00	-74	290	-9.00	-52	256
-10.00	105	240	-10.00	109	315	-10.00	-80	305	-10.00	-58	270
-11.00	109	252	-11.00	113	330	-11.00	-86	320	-11.00	-64	284
-12.00	113	264	-12.00	117	345	-12.00	-92	335	-12.00	-70	298
-13.00	117	276	-13.00	121	360	-13.00	-98	350	-13.00	-76	312
-14.00	121	288	-14.00	125	375	-14.00	-104	365	-14.00	-82	326
-15.00	125	300	-15.00	129	390	-15.00	-110	380	-15.00	-88	340
-16.00	129	312	-16.00	133	405	-16.00	-116	395	-16.00	-94	354
-17.00	133	324	-17.00	137	420	-17.00	-122	410	-17.00	-100	368
-18.00	137	336	-18.00	141	435	-18.00	-128	425	-18.00	-106	382
-19.00	141	348	-19.00	145	450	-19.00	-134	440	-19.00	-112	396
-20.00	145	360	-20.00	149	465	-20.00	-140	455	-20.00	-118	410

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (IUPUI 1975.0)

GEOMAGNETIC LAT. = -60.00 LONG. = 0.00	GEOMAGNETIC LAT. = -60.00 LONG. = 10.00	GEOMAGNETIC LAT. = -60.00 LONG. = 20.00	GEOMAGNETIC LAT. = -60.00 LONG. = 30.00	GEOMAGNETIC LAT. = -60.00 LONG. = 40.00	GEOMAGNETIC LAT. = -60.00 LONG. = 50.00	GEOMAGNETIC LAT. = -60.00 LONG. = 60.00	GEOMAGNETIC LAT. = -60.00 LONG. = 70.00
20.00 -27 29 15.00 -20 29 10.00 -17 29 5.00 -14 29 0.00 -11 29 -5.00 -8 29 -10.00 -5 29 -15.00 -2 29 -20.00 1 29 -25.00 4 29 -30.00 7 29 -35.00 10 29 -40.00 13 29 -45.00 16 29 -50.00 19 29 -55.00 22 29 -60.00 25 29 -65.00 28 29 -70.00 31 29 -75.00 34 29 -80.00 37 29 -85.00 40 29 -90.00 43 29 -95.00 46 29 -100.00 49 29 -105.00 52 29 -110.00 55 29 -115.00 58 29 -120.00 61 29 -125.00 64 29 -130.00 67 29 -135.00 70 29 -140.00 73 29 -145.00 76 29 -150.00 79 29 -155.00 82 29 -160.00 85 29 -165.00 88 29 -170.00 91 29 -175.00 94 29 -180.00 97 29 -185.00 100 29 -190.00 103 29 -195.00 106 29 -200.00 109 29 -205.00 112 29 -210.00 115 29 -215.00 118 29 -220.00 121 29 -225.00 124 29 -230.00 127 29 -235.00 130 29 -240.00 133 29 -245.00 136 29 -250.00 139 29 -255.00 142 29 -260.00 145 29 -265.00 148 29 -270.00 151 29 -275.00 154 29 -280.00 157 29 -285.00 160 29 -290.00 163 29 -295.00 166 29 -300.00 169 29 -305.00 172 29 -310.00 175 29 -315.00 178 29 -320.00 181 29 -325.00 184 29 -330.00 187 29 -335.00 190 29 -340.00 193 29 -345.00 196 29 -350.00 199 29 -355.00 202 29 -360.00 205 29 -365.00 208 29 -370.00 211 29 -375.00 214 29 -380.00 217 29 -385.00 220 29 -390.00 223 29 -395.00 226 29 -400.00 229 29 -405.00 232 29 -410.00 235 29 -415.00 238 29 -420.00 241 29 -425.00 244 29 -430.00 247 29 -435.00 250 29 -440.00 253 29 -445.00 256 29 -450.00 259 29 -455.00 262 29 -460.00 265 29 -465.00 268 29 -470.00 271 29 -475.00 274 29 -480.00 277 29 -485.00 280 29 -490.00 283 29 -495.00 286 29 -500.00 289 29 -505.00 292 29 -510.00 295 29 -515.00 298 29 -520.00 301 29 -525.00 304 29 -530.00 307 29 -535.00 310 29 -540.00 313 29 -545.00 316 29 -550.00 319 29 -555.00 322 29 -560.00 325 29 -565.00 328 29 -570.00 331 29 -575.00 334 29 -580.00 337 29 -585.00 340 29 -590.00 343 29 -595.00 346 29 -600.00 349 29 -605.00 352 29 -610.00 355 29 -615.00 358 29 -620.00 361 29 -625.00 364 29 -630.00 367 29 -635.00 370 29 -640.00 373 29 -645.00 376 29 -650.00 379 29 -655.00 382 29 -660.00 385 29 -665.00 388 29 -670.00 391 29 -675.00 394 29 -680.00 397 29 -685.00 400 29 -690.00 403 29 -695.00 406 29 -700.00 409 29 -705.00 412 29 -710.00 415 29 -715.00 418 29 -720.00 421 29 -725.00 424 29 -730.00 427 29 -735.00 430 29 -740.00 433 29 -745.00 436 29 -750.00 439 29 -755.00 442 29 -760.00 445 29 -765.00 448 29 -770.00 451 29 -775.00 454 29 -780.00 457 29 -785.00 460 29 -790.00 463 29 -795.00 466 29 -800.00 469 29 -805.00 472 29 -810.00 475 29 -815.00 478 29 -820.00 481 29 -825.00 484 29 -830.00 487 29 -835.00 490 29 -840.00 493 29 -845.00 496 29 -850.00 499 29 -855.00 502 29 -860.00 505 29 -865.00 508 29 -870.00 511 29 -875.00 514 29 -880.00 517 29 -885.00 520 29 -890.00 523 29 -895.00 526 29 -900.00 529 29 -905.00 532 29 -910.00 535 29 -915.00 538 29 -920.00 541 29 -925.00 544 29 -930.00 547 29 -935.00 550 29 -940.00 553 29 -945.00 556 29 -950.00 559 29 -955.00 562 29 -960.00 565 29 -965.00 568 29 -970.00 571 29 -975.00 574 29 -980.00 577 29 -985.00 580 29 -990.00 583 29 -995.00 586 29 -1000.00 589 29	10.00 -23 56 5.00 -24 57 0.00 -25 58 -5.00 -26 59 -10.00 -27 60 -15.00 -28 61 -20.00 -29 62 -25.00 -30 63 -30.00 -31 64 -35.00 -32 65 -40.00 -33 66 -45.00 -34 67 -50.00 -35 68 -55.00 -36 69 -60.00 -37 70 -65.00 -38 71 -70.00 -39 72 -75.00 -40 73 -80.00 -41 74 -85.00 -42 75 -90.00 -43 76 -95.00 -44 77 -100.00 -45 78 -105.00 -46 79 -110.00 -47 80 -115.00 -48 81 -120.00 -49 82 -125.00 -50 83 -130.00 -51 84 -135.00 -52 85 -140.00 -53 86 -145.00 -54 87 -150.00 -55 88 -155.00 -56 89 -160.00 -57 90 -165.00 -58 91 -170.00 -59 92 -175.00 -60 93 -180.00 -61 94 -185.00 -62 95 -190.00 -63 96 -195.00 -64 97 -200.00 -65 98 -205.00 -66 99 -210.00 -67 100 -215.00 -68 101 -220.00 -69 102 -225.00 -70 103 -230.00 -71 104 -235.00 -72 105 -240.00 -73 106 -245.00 -74 107 -250.00 -75 108 -255.00 -76 109 -260.00 -77 110 -265.00 -78 111 -270.00 -79 112 -275.00 -80 113 -280.00 -81 114 -285.00 -82 115 -290.00 -83 116 -295.00 -84 117 -300.00 -85 118 -305.00 -86 119 -310.00 -87 120 -315.00 -88 121 -320.00 -89 122 -325.00 -90 123 -330.00 -91 124 -335.00 -92 125 -340.00 -93 126 -345.00 -94 127 -350.00 -95 128 -355.00 -96 129 -360.00 -97 130 -365.00 -98 131 -370.00 -99 132 -375.00 -100 133 -380.00 -101 134 -385.00 -102 135 -390.00 -103 136 -395.00 -104 137 -400.00 -105 138 -405.00 -106 139 -410.00 -107 140 -415.00 -108 141 -420.00 -109 142 -425.00 -110 143 -430.00 -111 144 -435.00 -112 145 -440.00 -113 146 -445.00 -114 147 -450.00 -115 148 -455.00 -116 149 -460.00 -117 150 -465.00 -118 151 -470.00 -119 152 -475.00 -120 153 -480.00 -121 154 -485.00 -122 155 -490.00 -123 156 -495.00 -124 157 -500.00 -125 158 -505.00 -126 159 -510.00 -127 160 -515.00 -128 161 -520.00 -129 162 -525.00 -130 163 -530.00 -131 164 -535.00 -132 165 -540.00 -133 166 -545.00 -134 167 -550.00 -135 168 -555.00 -136 169 -560.00 -137 170 -565.00 -138 171 -570.00 -139 172 -575.00 -140 173 -580.00 -141 174 -585.00 -142 175 -590.00 -143 176 -595.00 -144 177 -600.00 -145 178 -605.00 -146 179 -610.00 -147 180 -615.00 -148 181 -620.00 -149 182 -625.00 -150 183 -630.00 -151 184 -635.00 -152 185 -640.00 -153 186 -645.00 -154 187 -650.00 -155 188 -655.00 -156 189 -660.00 -157 190 -665.00 -158 191 -670.00 -159 192 -675.00 -160 193 -680.00 -161 194 -685.00 -162 195 -690.00 -163 196 -695.00 -164 197 -700.00 -165 198 -705.00 -166 199 -710.00 -167 200 -715.00 -168 201 -720.00 -169 202 -725.00 -170 203 -730.00 -171 204 -735.00 -172 205 -740.00 -173 206 -745.00 -174 207 -750.00 -175 208 -755.00 -176 209 -760.00 -177 210 -765.00 -178 211 -770.00 -179 212 -775.00 -180 213 -780.00 -181 214 -785.00 -182 215 -790.00 -183 216 -795.00 -184 217 -800.00 -185 218 -805.00 -186 219 -810.00 -187 220 -815.00 -188 221 -820.00 -189 222 -825.00 -190 223 -830.00 -191 224 -835.00 -192 225 -840.00 -193 226 -845.00 -194 227 -850.00 -195 228 -855.00 -196 229 -860.00 -197 230 -865.00 -198 231 -870.00 -199 232 -875.00 -200 233 -880.00 -201 234 -885.00 -202 235 -890.00 -203 236 -895.00 -204 237 -900.00 -205 238 -905.00 -206 239 -910.00 -207 240 -915.00 -208 241 -920.00 -209 242 -925.00 -210 243 -930.00 -211 244 -935.00 -212 245 -940.00 -213 246 -945.00 -214 247 -950.00 -215 248 -955.00 -216 249 -960.00 -217 250 -965.00 -218 251 -970.00 -219 252 -975.00 -220 253 -980.00 -221 254 -985.00 -222 255 -990.00 -223 256 -995.00 -224 257 -1000.00 -225 258	10.00 -32 70 5.00 -33 71 0.00 -34 72 -5.00 -35 73 -10.00 -36 74 -15.00 -37 75 -20.00 -38 76 -25.00 -39 77 -30.00 -40 78 -35.00 -41 79 -40.00 -42 80 -45.00 -43 81 -50.00 -44 82 -55.00 -45 83 -60.00 -46 84 -65.00 -47 85 -70.00 -48 86 -75.00 -49 87 -80.00 -50 88 -85.00 -51 89 -90.00 -52 90 -95.00 -53 91 -100.00 -54 92 -105.00 -55 93 -110.00 -56 94 -115.00 -57 95 -120.00 -58 96 -125.00 -59 97 -130.00 -60 98 -135.00 -61 99 -140.00 -62 100 -145.00 -63 101 -150.00 -64 102 -155.00 -65 103 -160.00 -66 104 -165.00 -67 105 -170.00 -68 106 -175.00 -69 107 -180.00 -70 108 -185.00 -71 109 -190.00 -72 110 -195.00 -73 111 -200.00 -74 112 -205.00 -75 113 -210.00 -76 114 -215.00 -77 115 -220.00 -78 116 -225.00 -79 117 -230.00 -80 118 -235.00 -81 119 -240.00 -82 120 -245.00 -83 121 -250.00 -84 122 -255.00 -85 123 -260.00 -86 124 -265.00 -87 125 -270.00 -88 126 -275.00 -89 127 -280.00 -90 128 -285.00 -91 129 -290.00 -92 130 -295.00 -93 131 -300.00 -94 132 -305.00 -95 133 -310.00 -96 134 -315.00 -97 135 -320.00 -98 136 -325.00 -99 137 -330.00 -100 138 -335.00 -101 139 -340.00 -102 140 -345.00 -103 141 -350.00 -104 142 -355.00 -105 143 -360.00 -106 144 -365.00 -107 145 -370.00 -108 146 -375.00 -109 147 -380.00 -110 148 -385.00 -111 149 -390.00 -112 150 -395.00 -113 151 -400.00 -114 152 -405.00 -115 153 -410.00 -116 154 -415.00 -117 155 -420.00 -118 156 -425.00 -119 157 -430.00 -120 158 -435.00 -121 159 -440.00 -122 160 -445.00 -123 161 -450.00 -124 162 -455.00 -125 163 -460.00 -126 164 -465.00 -127 165 -470.00 -128 166 -475.00 -129 167 -480.00 -130 168 -485.00 -131 169 -490.00 -132 170 -495.00 -133 171 -500.00 -134 172 -505.00 -135 173 -510.00 -136 174 -515.00 -137 175 -520.00 -138 176 -525.00 -139 177 -530.00 -140 178 -535.00 -141 179 -540.00 -142 180 -545.00 -143 181 -550.00 -144 182 -555.00 -145 183 -560.00 -146 184 -565.00 -147 185 -570.00 -148 186 -575.00 -149 187 -580.00 -150 188 -585.00 -151 189 -590.00 -152 190 -595.00 -153 191 -600.00 -154 192 -605.00 -155 193 -610.00 -156 194 -615.00 -157 195 -620.00 -158 196 -625.00 -159 197 -630.00 -160 198 -635.00 -161 199 -640.00 -162 200 -645.00 -163 201 -650.00 -164 202 -655.00 -165 203 -660.00 -166 204 -665.00 -167 205 -670.00 -168 206 -675.00 -169 207 -680.00 -170 208 -685.00 -171 209 -690.00 -172 210 -695.00 -173 211 -700.00 -174 212 -705.00 -175 213 -710.00 -176 214 -715.00 -177 215 -720.00 -178 216 -725.00 -179 217 -730.00 -180 218 -735.00 -181 219 -740.00 -182 220 -745.00 -183 221 -750.00 -184 222 -755.00 -185 223 -760.00 -186 224 -765.00 -187 225 -770.00 -188 226 -775.00 -189 227 -780.00 -190 228 -785.00 -191 229 -790.00 -192 230 -795.00 -193 231 -800.00 -194 232 -805.00 -195 233 -810.00 -196 234 -815.00 -197 235 -820.00 -198 236 -825.00 -199 237 -830.00 -200 238 -835.00 -201 239 -840.00 -202 240 -845.00 -203 241 -850.00 -204 242 -855.00 -205 243 -860.00 -206 244 -865.00 -207 245 -870.00 -208 246 -875.00 -209 247 -880.00 -210 248 -885.00 -211 249 -890.00 -212 250 -895.00 -213 251 -900.00 -214 252 -905.00 -215 253 -910.00 -216 254 -915.00 -217 255 -920.00 -218 256 -925.00 -219 257 -930.00 -220 258 -935.00 -221 259 -940.00 -222 260 -945.00 -223 261 -950.00 -224 262 -955.00 -225 263 -960.00 -226 264 -965.00 -227 265 -970.00 -228 266 -975.00 -229 267 -980.00 -230 268 -985.00 -231 269 -990.00 -232 270 -995.00 -233 271 -1000.00 -234 272					

TABLE A1 (continued)

2000

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR MOR. 3 GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -65.00 LONG. = 0.00			GEOGRAPHIC LAT. = -65.00 LONG. = 15.00			GEOGRAPHIC LAT. = -65.00 LONG. = 30.00			GEOGRAPHIC LAT. = -65.00 LONG. = 45.00			GEOGRAPHIC LAT. = -65.00 LONG. = 60.00			GEOGRAPHIC LAT. = -65.00 LONG. = 75.00		
RIG ASYMPTOTIC (GV)	LAT	LONG	RIG ASYMPTOTIC (GV)	LAT	LONG	RIG ASYMPTOTIC (GV)	LAT	LONG	RIG ASYMPTOTIC (GV)	LAT	LONG	RIG ASYMPTOTIC (GV)	LAT	LONG	RIG ASYMPTOTIC (GV)	LAT	LONG
10.00	-5	15	11.08	-11	23	13.00	-12	30	10.00	-24	39	10.53	-33	49	10.00	-41	62
9.00	-5	14	11.00	-11	21	12.00	-18	30	9.00	-20	39	9.00	-34	59	9.00	-42	69
8.00	-6	13	11.00	-12	21	11.00	-19	30	8.00	-20	38	8.00	-34	58	8.00	-42	68
7.00	-7	12	11.00	-13	20	10.00	-19	29	7.00	-25	45	7.00	-31	56	7.00	-37	69
6.00	-5	20	11.00	-10	29	8.00	-14	36	6.00	-15	40	6.00	-24	51	6.00	-32	65
5.00	-6	27	11.00	-1	33	5.00	-4	40	5.00	-10	46	5.00	-19	53	5.00	-30	64
4.00	16	30	11.00	10	32	4.00	0	36	4.00	-10	44	4.00	-21	54	4.00	-30	67
3.00	22	42	11.00	15	42	3.00	9	45	3.00	1	49	3.00	-11	50	3.00	-24	65
2.50	24	46	11.00	30	66	2.00	24	56	1.00	11	52	2.00	-5	57	2.00	-17	68
2.00	27	50	11.00	31	72	1.50	24	56	1.00	10	53	1.90	-2	59	1.30	-15	67
2.70	29	54	11.00	30	75	1.50	23	58	1.00	12	58	1.70	2	59	1.80	-14	66
2.60	30	58	11.00	21	79	1.70	26	63	1.70	17	59	1.70	2	59	1.70	-15	67
2.50	30	61	11.00	24	91	1.60	30	69	1.60	18	59	1.60	5	61	1.60	-12	68
2.40	29	63	11.00	27	105	1.50	30	72	1.40	16	60	1.50	7	61	1.40	-10	68
2.30	28	65	11.00	11	111	1.40	30	78	1.40	21	66	1.30	8	63	1.30	-7	68
2.20	27	69	11.00	17	129	1.30	31	90	1.30	24	66	1.20	12	63	1.20	-7	68
2.10	28	76	11.00	-11	163	1.20	29	96	1.20	27	72	1.10	14	66	1.10	-4	69
2.00	27	88	11.13	-12	166	1.10	24	114	1.13	26	76	1.10	16	68	1.00	-1	69
1.90	21	101	11.18	-12	168	1.00	17	127	1.00	32	86	1.00	20	71	1.00	2	73
1.80	13	110	11.17	-13	172	1.00	-2	153	1.00	37	97	1.00	24	76	1.00	5	71
1.70	0	117	11.16	-13	176	1.00	-8	156	1.00	34	115	1.00	24	76	1.00	5	71
1.60	0	124	11.15	-13	181	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.50	-4	212	11.14	-13	188	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.49	-7	242	11.13	-13	199	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.48	-22	284	11.12	-17	216	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.47	-11	290	11.11	-7	251	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.46	-2	285	11.10	-7	251	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.45	-1	339	11.08	-11	251	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.44	-22	272	11.07	-11	251	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.43	-2	424	11.06	-10	251	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.42	-24	297	11.05	-7	251	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.41	-3	505	11.04	-7	251	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71
1.40	0	0	11.03	-7	251	1.00	-8	162	1.00	34	115	1.00	24	76	1.00	5	71

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = -65.00		LAT. = -65.00		LAT. = -65.00		LAT. = -65.00		LAT. = -65.00	
LONG. = 90.00		LONG. = 120.00		LONG. = 135.00		LONG. = 150.00		LONG. = 165.00	
RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC
(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG
10.00 -49 79	17.00 -55 101	10.00 -59 126	10.00 -60 154	10.00 -59 182	10.00 -59 182	10.00 -55 287	10.00 -55 287	10.00 -55 287	10.00 -55 287
9.00 -49 82	16.00 -54 102	9.00 -58 127	9.00 -59 154	9.00 -58 182	9.00 -58 182	9.00 -55 288	9.00 -55 288	9.00 -55 288	9.00 -55 288
8.00 -47 84	15.00 -52 103	8.00 -56 127	8.00 -57 155	8.00 -56 184	8.00 -56 184	8.00 -54 210	8.00 -54 210	8.00 -54 210	8.00 -54 210
7.00 -43 84	14.00 -50 103	7.00 -56 127	7.00 -56 156	7.00 -55 185	7.00 -55 185	7.00 -53 212	7.00 -53 212	7.00 -53 212	7.00 -53 212
6.00 -41 81	13.00 -44 101	6.00 -55 126	6.00 -55 156	6.00 -55 187	6.00 -55 187	6.00 -51 214	6.00 -51 214	6.00 -51 214	6.00 -51 214
5.00 -41 79	12.00 -50 101	5.00 -55 127	5.00 -56 157	5.00 -54 187	5.00 -54 187	5.00 -48 213	5.00 -48 213	5.00 -48 213	5.00 -48 213
4.00 -38 83	11.00 -46 102	4.00 -52 128	4.00 -54 158	4.00 -52 189	4.00 -52 189	4.00 -46 216	4.00 -46 216	4.00 -46 216	4.00 -46 216
3.00 -36 81	10.00 -45 102	3.00 -51 129	3.00 -52 160	3.00 -49 190	3.00 -49 190	3.00 -42 218	3.00 -42 218	3.00 -42 218	3.00 -42 218
2.00 -35 81	9.00 -41 101	2.00 -48 129	2.00 -49 161	2.00 -44 193	2.00 -44 193	2.00 -36 221	2.00 -36 221	2.00 -36 221	2.00 -36 221
1.50 -29 80	8.00 -41 101	1.50 -47 129	1.50 -49 162	1.50 -44 193	1.50 -44 193	1.50 -35 221	1.50 -35 221	1.50 -35 221	1.50 -35 221
1.00 -29 81	7.00 -40 102	1.00 -47 130	1.00 -48 162	1.00 -44 194	1.00 -44 194	1.00 -35 222	1.00 -35 222	1.00 -35 222	1.00 -35 222
1.00 -28 82	6.00 -33 101	1.00 -46 129	1.00 -47 162	1.00 -43 194	1.00 -43 194	1.00 -33 223	1.00 -33 223	1.00 -33 223	1.00 -33 223
1.00 -26 80	5.00 -33 101	1.00 -46 130	1.00 -47 163	1.00 -42 194	1.00 -42 194	1.00 -32 223	1.00 -32 223	1.00 -32 223	1.00 -32 223
1.00 -27 81	4.00 -33 102	1.00 -45 130	1.00 -46 163	1.00 -41 195	1.00 -41 195	1.00 -31 224	1.00 -31 224	1.00 -31 224	1.00 -31 224
1.00 -24 81	3.00 -37 101	1.00 -45 130	1.00 -46 163	1.00 -40 195	1.00 -40 195	1.00 -30 225	1.00 -30 225	1.00 -30 225	1.00 -30 225
1.00 -24 81	2.00 -36 102	1.00 -44 130	1.00 -45 163	1.00 -39 196	1.00 -39 196	1.00 -29 225	1.00 -29 225	1.00 -29 225	1.00 -29 225
1.00 -21 81	1.00 -36 101	1.00 -44 130	1.00 -45 163	1.00 -38 196	1.00 -38 196	1.00 -27 225	1.00 -27 225	1.00 -27 225	1.00 -27 225
1.00 -21 81	1.00 -34 102	1.00 -43 130	1.00 -44 164	1.00 -37 197	1.00 -37 197	1.00 -26 227	1.00 -26 227	1.00 -26 227	1.00 -26 227
1.00 -20 81	1.00 -33 102	1.00 -41 130	1.00 -42 164	1.00 -36 197	1.00 -36 197	1.00 -24 228	1.00 -24 228	1.00 -24 228	1.00 -24 228
1.00 -18 81	1.00 -32 102	1.00 -41 130	1.00 -41 164	1.00 -34 198	1.00 -34 198	1.00 -22 229	1.00 -22 229	1.00 -22 229	1.00 -22 229
1.00 -16 82	1.00 -31 101	1.00 -40 130	1.00 -40 165	1.00 -33 199	1.00 -33 199	1.00 -19 230	1.00 -19 230	1.00 -19 230	1.00 -19 230
1.00 -15 81	1.00 -29 102	1.00 -38 130	1.00 -38 165	1.00 -30 200	1.00 -30 200	1.00 -17 232	1.00 -17 232	1.00 -17 232	1.00 -17 232
1.00 -10 82	1.00 -27 101	1.00 -36 131	1.00 -37 166	1.00 -28 201	1.00 -28 201	1.00 -13 234	1.00 -13 234	1.00 -13 234	1.00 -13 234
1.00 -6 82	1.00 -24 101	1.00 -34 131	1.00 -35 166	1.00 -25 202	1.00 -25 202	1.00 -9 237	1.00 -9 237	1.00 -9 237	1.00 -9 237
1.00 -1 83	1.00 -21 101	1.00 -32 131	1.00 -33 167	1.00 -21 203	1.00 -21 203	1.00 -3 242	1.00 -3 242	1.00 -3 242	1.00 -3 242
1.00 6 85	1.00 -17 101	1.00 -30 131	1.00 -30 168	1.00 -16 206	1.00 -16 206	1.00 4 259	1.00 4 259	1.00 4 259	1.00 4 259
1.00 18 89	1.00 -10 101	1.00 -23 131	1.00 -22 169	1.00 -7 209	1.00 -7 209	1.00 16 271	1.00 16 271	1.00 16 271	1.00 16 271
1.00 19 91	1.00 3 100	1.00 -14 130	1.00 -10 170	1.00 10 219	1.00 10 219	1.00 15 274	1.00 15 274	1.00 15 274	1.00 15 274
1.00 21 91	1.00 6 101	1.00 -12 129	1.00 -9 169	1.00 14 224	1.00 14 224	1.00 15 280	1.00 15 280	1.00 15 280	1.00 15 280
1.00 23 93	1.00 8 100	1.00 -10 130	1.00 -7 170	1.00 17 227	1.00 17 227	1.00 15 285	1.00 15 285	1.00 15 285	1.00 15 285
1.00 25 94	1.00 11 101	1.00 -8 129	1.00 -4 170	1.00 21 232	1.00 21 232	1.00 14 293	1.00 14 293	1.00 14 293	1.00 14 293
1.00 27 96	1.00 15 101	1.00 -6 128	1.00 -2 170	1.00 25 236	1.00 25 236	1.00 12 302	1.00 12 302	1.00 12 302	1.00 12 302
1.00 29 98	1.00 19 100	1.00 -4 128	1.00 4 169	1.00 30 251	1.00 30 251	1.00 10 314	1.00 10 314	1.00 10 314	1.00 10 314
1.00 32 100	1.00 23 99	1.00 -2 126	1.00 6 169	1.00 34 279	1.00 34 279	1.00 8 332	1.00 8 332	1.00 8 332	1.00 8 332
1.00 35 103	1.00 26 98	1.00 0 125	1.00 10 169	1.00 38 307	1.00 38 307	1.00 6 350	1.00 6 350	1.00 6 350	1.00 6 350
1.00 38 106	1.00 30 97	1.00 2 122	1.00 14 166	1.00 42 336	1.00 42 336	1.00 4 368	1.00 4 368	1.00 4 368	1.00 4 368
1.00 41 109	1.00 40 98	1.00 0 119	1.00 21 162	1.00 46 366	1.00 46 366	1.00 2 386	1.00 2 386	1.00 2 386	1.00 2 386

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = -65.00 LONG. = 180.00			LAT. = -65.00 LONG. = 210.00			LAT. = -65.00 LONG. = 225.00			LAT. = -65.00 LONG. = 240.00			LAT. = -65.00 LONG. = 255.00			LAT. = -65.00 LONG. = 270.00		
RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC		RIG	ASYMPTOTIC	
(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG		(GV)	LAT LONG	
10.00	-50 231		13.00	-44 -109		10.00	-36 -91		10.00	-27 -73		10.00	-18 -57		10.00	-8 -42	
9.00	-49 231		11.00	-45 -109		9.00	-36 -90		9.00	-27 -73		9.00	-17 -57		9.00	-7 -42	
8.00	-49 231		10.00	-45 -107		8.00	-35 -89		8.00	-27 -72		8.00	-17 -55		8.00	-7 -40	
7.00	-47 236		9.00	-40 -106		7.00	-33 -85		7.00	-25 -66		7.00	-16 -52		7.00	-7 -37	
6.00	-43 236		8.00	-35 -101		6.00	-27 -82		6.00	-19 -63		6.00	-10 -46		6.00	-2 -30	
5.00	-40 237		7.00	-31 -102		5.00	-21 -82		5.00	-11 -61		5.00	0 -41		5.00	10 -23	
4.00	-36 240		6.00	-24 -99		4.00	-19 -79		4.00	-5 -58		4.00	4 -43		4.00	16 -9	
3.00	-33 241		5.00	-22 -96		3.00	-10 -73		3.00	4 -47		3.00	16 -14		3.00	19 24	
2.00	-26 247		4.00	-12 -90		2.00	1 -60		2.00	4 -46		2.00	16 -12		2.00	16 16	
1.00	-23 247		3.00	-10 -87		1.00	4 -57		2.00	4 -45		2.00	16 -9		2.00	13 43	
1.00	-23 247		2.00	-3 -86		1.00	5 -55		2.00	5 -44		2.00	16 -7		2.00	9 49	
1.00	-21 249		1.00	-3 -84		1.00	6 -52		2.00	5 -41		2.00	15 -4		2.00	7 56	
1.00	-19 250		1.00	-3 -82		1.00	8 -47		2.00	7 -38		2.00	15 0		2.00	4 63	
1.00	-17 252		1.00	-4 -81		1.00	10 -43		2.00	10 -35		2.00	16 7		2.00	1 75	
1.00	-16 252		1.00	-7 -78		1.00	12 -38		2.00	11 -31		2.00	16 16		2.00	-4 102	
1.00	-13 254		1.00	0 -76		1.00	12 -30		2.00	12 -23		2.00	13 26		2.00	-12 579	
1.00	-11 256		1.00	7 -72		1.00	14 -22		2.00	12 -26		2.00	9 35		2.00	-12 579	
1.00	-9 256		1.00	7 -61		1.00	14 -19		2.00	12 -23		2.00	6 42		2.00	-18 346	
1.00	-6 260		1.00	3 -56		1.00	5 -19		2.00	14 -16		2.00	3 55		2.00	-18 346	
1.00	-3 264		1.00	3 -56		1.00	5 -19		2.00	14 -16		2.00	3 55		2.00	-18 346	
1.00	0 268		1.00	10 -50		1.00	6 -14		2.00	14 -17		2.00	4 46		2.00	-18 346	
1.00	5 275		1.00	10 -50		1.00	6 -14		2.00	14 -17		2.00	4 46		2.00	-18 346	
1.00	9 285		1.00	1 -2		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	11 304		1.00	3 8		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-5 352		1.00	-3 8		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-10 363		1.00	-5 12		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-15 378		1.00	-7 16		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-22 403		1.00	-9 27		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-25 423		1.00	-11 43		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-28 425		1.00	-11 43		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-31 436		1.00	-10 70		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-34 441		1.00	-8 111		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-37 443		1.00	-6 183		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	
1.00	-40 446		1.00	-4 183		1.00	8 -52		2.00	11 6		2.00	12 445		2.00	-18 346	

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = -65.00			LAT. = -65.00			LAT. = -65.00			LAT. = -65.00			LAT. = -65.00			LAT. = -65.00		
LONG. = 278.80			LONG. = 205.00			LONG. = 306.00			LONG. = 315.00			LONG. = 330.00			LONG. = 345.00		
RIG ASYMPTOTIC			RIG ASYMPTOTIC			RIG ASYMPTOTIC			RIG ASYMPTOTIC			RIG ASYMPTOTIC			RIG ASYMPTOTIC		
(GV) LAT LONG			(GV) LAT LONG			(GV) LAT LONG			(GV) LAT LONG			(GV) LAT LONG			(GV) LAT LONG		
1 -20	13.00	6 -10	10.00	8 -10	10.00	7 -4	10.00	4 2	10.00	0 0	10.00	0 0	10.00	0 0	10.00	0 0	
2 -20	1.00	8 -17	9.00	10 -10	9.00	9 -4	9.00	6 1	9.00	1 7	9.00	1 7	9.00	1 7	9.00	1 7	
3 -27	1.00	4 -16	8.00	11 -6	8.00	10 -3	8.00	6 1	8.00	0 0	8.00	0 0	8.00	0 0	8.00	0 0	
4 -23	7.00	9 -12	7.00	11 -5	7.00	10 -1	7.00	5 3	7.00	1 16	7.00	1 16	7.00	1 16	7.00	1 16	
5 -15	5.00	10 -4	6.00	12 3	6.00	10 6	6.00	0 9	6.00	0 0	6.00	0 0	6.00	0 0	6.00	0 0	
6 -1	5.00	21 14	5.00	22 20	5.00	20 21	5.00	16 21	5.00	11 22	5.00	11 22	5.00	11 22	5.00	11 22	
7 -1	4.00	20 49	4.00	21 59	4.00	20 53	4.00	15 53	4.00	10 53	4.00	10 53	4.00	10 53	4.00	10 53	
8 -1	3.00	13 52	3.00	19 63	3.00	18 58	3.00	14 58	3.00	9 58	3.00	9 58	3.00	9 58	3.00	9 58	
9 -27	1.30	16 56	1.30	16 66	1.30	14 59	1.30	12 59	1.30	8 59	1.30	8 59	1.30	8 59	1.30	8 59	
10 -29	1.70	14 59	1.70	14 70	1.70	12 62	1.70	10 62	1.70	7 62	1.70	7 62	1.70	7 62	1.70	7 62	
11 -29	1.50	13 62	1.50	12 73	1.50	10 65	1.50	8 65	1.50	5 65	1.50	5 65	1.50	5 65	1.50	5 65	
12 -32	3.00	11 66	3.00	10 77	3.00	9 70	3.00	7 70	3.00	4 70	3.00	4 70	3.00	4 70	3.00	4 70	
13 -35	1.30	10 71	1.30	9 81	1.30	8 74	1.30	6 74	1.30	3 74	1.30	3 74	1.30	3 74	1.30	3 74	
14 -40	3.00	9 78	3.00	8 88	3.00	7 91	3.00	5 91	3.00	2 91	3.00	2 91	3.00	2 91	3.00	2 91	
15 -45	1.20	4 88	1.20	3 97	1.20	2 111	1.20	1 111	1.20	0 111	1.20	0 111	1.20	0 111	1.20	0 111	
16 -44	1.10	-1 104	1.10	-2 114	1.10	0 97	1.10	0 97	1.10	0 63	1.10	0 63	1.10	0 63	1.10	0 63	
17 -47	1.00	-7 136	1.00	-7 138	1.00	-4 113	1.00	-3 113	1.00	0 69	1.00	0 69	1.00	0 69	1.00	0 69	
18 -50	2.30	-5 141	2.30	-4 351	2.30	-4 351	2.30	-3 351	2.30	-2 351	2.30	-2 351	2.30	-2 351	2.30	-2 351	
19 -53	1.30	-6 147	1.30	-6 509	1.30	-5 509	1.30	-4 509	1.30	-3 509	1.30	-3 509	1.30	-3 509	1.30	-3 509	
20 -54	2.30	-5 154	2.30	-5 252	2.30	-4 252	2.30	-3 252	2.30	-2 252	2.30	-2 252	2.30	-2 252	2.30	-2 252	
21 -49	1.30	-3 163	1.30	-3 493	1.30	-2 493	1.30	-1 493	1.30	0 493	1.30	0 493	1.30	0 493	1.30	0 493	
22 -57	2.30	-1 174	2.30	-3 303	2.30	-3 303	2.30	-2 303	2.30	-1 303	2.30	-1 303	2.30	-1 303	2.30	-1 303	
23 -62	1.30	6 108	1.30	5 407	1.30	4 407	1.30	3 407	1.30	2 407	1.30	2 407	1.30	2 407	1.30	2 407	
24 -75	2.30	11 212	2.30	6 386	2.30	5 386	2.30	4 386	2.30	3 386	2.30	3 386	2.30	3 386	2.30	3 386	
25 -12	1.30	-5 271	1.30	-5 271	1.30	-4 271	1.30	-3 271	1.30	-2 271	1.30	-2 271	1.30	-2 271	1.30	-2 271	
26 -27	1.30	-5 271	1.30	-5 271	1.30	-4 271	1.30	-3 271	1.30	-2 271	1.30	-2 271	1.30	-2 271	1.30	-2 271	
27 -307	2.30	-27 307	2.30	-27 307	2.30	-26 307	2.30	-25 307	2.30	-24 307	2.30	-24 307	2.30	-24 307	2.30	-24 307	
28 -72	2.72	-27 307	2.72	-27 307	2.72	-26 307	2.72	-25 307	2.72	-24 307	2.72	-24 307	2.72	-24 307	2.72	-24 307	

TABLE #1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -70.00 LONG. = 90.00	GEOGRAPHIC LAT. = -70.00 LONG. = 105.00	GEOGRAPHIC LAT. = -70.00 LONG. = 120.00	GEOGRAPHIC LAT. = -70.00 LONG. = 135.00	GEOGRAPHIC LAT. = -70.00 LONG. = 150.00	GEOGRAPHIC LAT. = -70.00 LONG. = 165.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
10.00 -50 60	10.00 -65 88	10.00 -70 114	10.00 -72 149	10.00 -71 186	10.00 -67 216
9.00 -57 70	9.00 -69 98	9.00 -69 116	9.00 -72 150	9.00 -71 186	9.00 -67 216
8.00 -56 73	8.00 -62 91	8.00 -68 116	8.00 -71 149	8.00 -70 186	8.00 -66 217
7.00 -53 73	7.00 -60 70	7.00 -67 114	7.00 -71 149	7.00 -70 186	7.00 -66 220
6.00 -51 70	6.00 -60 36	6.00 -67 112	6.00 -71 150	6.00 -69 191	6.00 -64 223
5.00 -52 67	5.00 -61 66	5.00 -68 115	5.00 -71 154	5.00 -69 193	5.00 -61 222
4.00 -49 71	4.00 -58 89	4.00 -66 115	4.00 -70 153	4.00 -67 194	4.00 -60 225
3.00 -46 68	3.00 -54 86	3.00 -66 116	3.00 -68 156	3.00 -65 196	3.00 -57 226
2.00 -42 67	2.00 -55 87	2.00 -65 115	2.00 -68 159	2.00 -65 196	2.00 -57 226
1.00 -35 66	1.00 -55 86	1.00 -64 116	1.00 -67 153	1.00 -62 200	1.00 -52 223
1.00 -35 67	1.00 -55 87	1.00 -64 116	1.00 -67 159	1.00 -62 200	1.00 -52 223
1.00 -35 68	1.00 -54 86	1.00 -64 116	1.00 -67 159	1.00 -61 201	1.00 -51 230
1.00 -35 69	1.00 -54 86	1.00 -64 116	1.00 -66 160	1.00 -61 201	1.00 -50 230
1.00 -35 70	1.00 -53 85	1.00 -63 116	1.00 -66 160	1.00 -61 201	1.00 -50 230
1.00 -35 71	1.00 -53 85	1.00 -63 116	1.00 -66 161	1.00 -60 202	1.00 -48 231
1.00 -35 72	1.00 -53 85	1.00 -62 116	1.00 -66 160	1.00 -59 202	1.00 -48 231
1.00 -35 73	1.00 -52 84	1.00 -63 116	1.00 -65 162	1.00 -59 203	1.00 -47 231
1.00 -35 74	1.00 -51 85	1.00 -62 116	1.00 -65 162	1.00 -58 203	1.00 -45 232
1.00 -35 75	1.00 -50 85	1.00 -62 116	1.00 -64 162	1.00 -57 204	1.00 -44 233
1.00 -35 76	1.00 -50 84	1.00 -61 116	1.00 -64 162	1.00 -56 204	1.00 -43 233
1.00 -35 77	1.00 -49 83	1.00 -61 116	1.00 -63 163	1.00 -55 205	1.00 -41 234
1.00 -35 78	1.00 -48 84	1.00 -60 116	1.00 -63 163	1.00 -54 205	1.00 -39 235
1.00 -35 79	1.00 -47 83	1.00 -60 116	1.00 -62 164	1.00 -52 206	1.00 -37 236
1.00 -35 80	1.00 -47 83	1.00 -59 116	1.00 -61 165	1.00 -51 206	1.00 -34 237
1.00 -35 81	1.00 -46 82	1.00 -58 115	1.00 -59 166	1.00 -48 207	1.00 -30 238
1.00 -35 82	1.00 -45 81	1.00 -58 115	1.00 -58 166	1.00 -48 208	1.00 -24 240
1.00 -35 83	1.00 -44 81	1.00 -57 114	1.00 -58 166	1.00 -48 209	1.00 -16 243
1.00 -35 84	1.00 -43 80	1.00 -56 114	1.00 -57 166	1.00 -47 209	1.00 -10 245
1.00 -35 85	1.00 -42 79	1.00 -55 113	1.00 -56 166	1.00 -46 209	1.00 -4 250
1.00 -35 86	1.00 -41 78	1.00 -54 112	1.00 -55 166	1.00 -45 209	1.00 4 251
1.00 -35 87	1.00 -40 77	1.00 -53 111	1.00 -54 165	1.00 -44 209	1.00 7 253
1.00 -35 88	1.00 -39 76	1.00 -52 111	1.00 -53 165	1.00 -43 209	1.00 7 253
1.00 -35 89	1.00 -38 75	1.00 -51 110	1.00 -52 165	1.00 -42 209	1.00 7 253
1.00 -35 90	1.00 -37 74	1.00 -50 110	1.00 -51 165	1.00 -41 209	1.00 7 253
1.00 -35 91	1.00 -36 73	1.00 -49 110	1.00 -50 165	1.00 -40 209	1.00 7 253
1.00 -35 92	1.00 -35 72	1.00 -48 110	1.00 -49 165	1.00 -39 209	1.00 7 253
1.00 -35 93	1.00 -34 71	1.00 -47 110	1.00 -48 165	1.00 -38 209	1.00 7 253
1.00 -35 94	1.00 -33 70	1.00 -46 110	1.00 -47 165	1.00 -37 209	1.00 7 253
1.00 -35 95	1.00 -32 69	1.00 -45 110	1.00 -46 165	1.00 -36 209	1.00 7 253
1.00 -35 96	1.00 -31 68	1.00 -44 110	1.00 -45 165	1.00 -35 209	1.00 7 253
1.00 -35 97	1.00 -30 67	1.00 -43 110	1.00 -44 165	1.00 -34 209	1.00 7 253
1.00 -35 98	1.00 -29 66	1.00 -42 110	1.00 -43 165	1.00 -33 209	1.00 7 253
1.00 -35 99	1.00 -28 65	1.00 -41 110	1.00 -42 165	1.00 -32 209	1.00 7 253
1.00 -35 00	1.00 -27 64	1.00 -40 110	1.00 -41 165	1.00 -31 209	1.00 7 253

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -70.00 LONG. = 140.00		GEOGRAPHIC LAT. = -70.00 LONG. = 210.00		GEOGRAPHIC LAT. = -70.00 LONG. = 275.00		GEOGRAPHIC LAT. = -70.00 LONG. = 240.00		GEOGRAPHIC LAT. = -70.00 LONG. = 255.00	
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
10.00 -61 239	11.00 -54 -102	10.00 -46 -85	10.00 -38 -71	10.00 -29 -57	10.00 -29 -57	10.00 -29 -57	10.00 -29 -57	10.00 -29 -57	10.00 -29 -57
9.00 -61 239	11.00 -54 -102	9.00 -46 -85	9.00 -38 -71	9.00 -29 -57	9.00 -29 -57	9.00 -29 -57	9.00 -29 -57	9.00 -29 -57	9.00 -29 -57
8.00 -60 241	11.00 -53 -100	8.00 -46 -84	8.00 -37 -69	8.00 -29 -56	8.00 -29 -56	8.00 -29 -56	8.00 -29 -56	8.00 -29 -56	8.00 -29 -56
7.00 -59 244	11.00 -51 -97	7.00 -44 -81	7.00 -34 -66	7.00 -28 -51	7.00 -28 -51	7.00 -28 -51	7.00 -28 -51	7.00 -28 -51	7.00 -28 -51
6.00 -56 246	11.00 -47 -95	6.00 -39 -78	6.00 -30 -63	6.00 -22 -49	6.00 -22 -49	6.00 -22 -49	6.00 -22 -49	6.00 -22 -49	6.00 -22 -49
5.00 -53 245	11.00 -44 -97	5.00 -34 -79	5.00 -23 -61	5.00 -13 -48	5.00 -13 -48	5.00 -13 -48	5.00 -13 -48	5.00 -13 -48	5.00 -13 -48
4.00 -52 247	11.00 -42 -94	4.00 -32 -78	4.00 -22 -62	4.00 -11 -46	4.00 -11 -46	4.00 -11 -46	4.00 -11 -46	4.00 -11 -46	4.00 -11 -46
3.00 -48 248	11.00 -37 -93	3.00 -24 -75	3.00 -11 -57	3.00 -2 -37	3.00 -2 -37	3.00 -2 -37	3.00 -2 -37	3.00 -2 -37	3.00 -2 -37
2.00 -41 251	11.00 -31 -88	2.00 -15 -68	2.00 -1 -47	2.00 -12 -20	2.00 -12 -20	2.00 -12 -20	2.00 -12 -20	2.00 -12 -20	2.00 -12 -20
1.98 -40 251	11.00 -27 -90	1.90 -12 -67	1.90 -2 -44	1.90 -14 -15	1.90 -14 -15	1.90 -14 -15	1.90 -14 -15	1.90 -14 -15	1.90 -14 -15
1.80 -40 252	11.00 -26 -86	1.80 -11 -66	1.80 -4 -42	1.80 -16 -9	1.80 -16 -9	1.80 -16 -9	1.80 -16 -9	1.80 -16 -9	1.80 -16 -9
1.70 -39 253	11.00 -23 -87	1.70 -8 -64	1.70 5 -41	1.70 16 1	1.70 16 1	1.70 16 1	1.70 16 1	1.70 16 1	1.70 16 1
1.60 -37 253	11.00 -21 -86	1.60 -6 -63	1.60 10 -33	1.60 17 12	1.60 17 12	1.60 17 12	1.60 17 12	1.60 17 12	1.60 17 12
1.50 -37 253	11.00 -20 -86	1.50 -5 -61	1.50 10 -30	1.50 15 23	1.50 15 23	1.50 15 23	1.50 15 23	1.50 15 23	1.50 15 23
1.40 -35 254	11.00 -20 -84	1.40 -4 -58	1.40 13 -23	1.40 12 15	1.40 12 15	1.40 12 15	1.40 12 15	1.40 12 15	1.40 12 15
1.30 -34 254	11.00 -18 -84	1.30 -1 -56	1.30 14 -17	1.30 2 60	1.30 2 60	1.30 2 60	1.30 2 60	1.30 2 60	1.30 2 60
1.20 -32 255	11.00 -15 -82	1.20 0 -56	1.20 15 -5	1.20 1 63	1.20 1 63	1.20 1 63	1.20 1 63	1.20 1 63	1.20 1 63
1.10 -31 256	11.00 -15 -81	1.10 3 -53	1.10 15 -5	1.10 1 63	1.10 1 63	1.10 1 63	1.10 1 63	1.10 1 63	1.10 1 63
1.00 -29 257	11.00 -11 -79	1.00 6 -48	1.00 14 7	1.00 0 66	1.00 0 66	1.00 0 66	1.00 0 66	1.00 0 66	1.00 0 66
.98 -27 258	11.00 -7 -77	.90 9 -41	.80 10 26	.80 0 66	.80 0 66	.80 0 66	.80 0 66	.80 0 66	.80 0 66
.80 -24 259	11.00 -5 -74	.80 12 -33	.70 -4 62	.70 0 66	.70 0 66	.70 0 66	.70 0 66	.70 0 66	.70 0 66
.70 -21 261	11.00 -1 -70	.70 14 -20	.60 -7 260	.60 0 66	.60 0 66	.60 0 66	.60 0 66	.60 0 66	.60 0 66
.60 -18 262	11.00 1 -65	.60 11 2	.50 12 007	.50 0 66	.50 0 66	.50 0 66	.50 0 66	.50 0 66	.50 0 66
.50 -13 265	11.00 1 -55	.50 5 49	.40 14 172	.40 0 66	.40 0 66	.40 0 66	.40 0 66	.40 0 66	.40 0 66
.40 -7 269	11.00 1 -37	.40 7 57	.30 13 413	.30 0 66	.30 0 66	.30 0 66	.30 0 66	.30 0 66	.30 0 66
.30 1 276	11.00 4 -355	.40 -8 70	.66 -15 288	.66 0 66	.66 0 66	.66 0 66	.66 0 66	.66 0 66	.66 0 66
.20 13 295	11.00 1 14	.47 -6 91	.65 -15 1036	.65 0 66	.65 0 66	.65 0 66	.65 0 66	.65 0 66	.65 0 66
.10 14 299	11.00 -4 26	.46 4 114	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.10 15 303	11.00 -10 41	.46 15 385	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.17 16 309	11.00 -7 66	.44 5 503	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.16 16 315	11.00 -25 138	.44 5 503	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.15 15 324	11.00 -12 140	.44 5 503	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.14 12 336	11.00 3 234	.44 5 503	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.13 4 353	11.00 -1 755	.44 5 503	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.12 -15 387	11.00 1 1	.44 5 503	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.11 -20 598	11.00 7 7621	.44 5 503	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.10 7 7621	11.00 7 7621	.44 5 503	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66
.09 F	11.00 F	.44 5 503	.63 3 400	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66	.63 0 66

TABLE A1 (CONTINUED)

145

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -75.00 LONG. = 90.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = -75.00 LONG. = 105.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = -75.00 LONG. = 120.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = -75.00 LONG. = 135.00	RIG ASYMPTOTIC (GV) LAT LONG	GEOGRAPHIC LAT. = -75.00 LONG. = 150.00	RIG ASYMPTOTIC (GV) LAT LONG
10.00 -64 58	10.00 -72 63	10.00 -72 63	10.00 -79 04	10.00 -79 04	10.00 -84 132	10.00 -84 132	10.00 -82 708	10.00 -76 240	10.00 -76 240
9.00 -64 53	9.00 -71 67	9.00 -71 67	9.00 -77 88	9.00 -77 88	9.00 -83 134	9.00 -83 134	9.00 -82 705	9.00 -76 239	9.00 -76 239
8.00 -63 56	8.00 -70 70	8.00 -70 70	8.00 -77 89	8.00 -77 89	8.00 -83 130	8.00 -83 130	8.00 -82 703	8.00 -76 248	8.00 -76 248
7.00 -61 57	7.00 -69 69	7.00 -69 69	7.00 -76 85	7.00 -76 85	7.00 -83 123	7.00 -83 123	7.00 -83 208	7.00 -76 245	7.00 -76 245
6.00 -61 53	6.00 -67 63	6.00 -67 63	6.00 -76 78	6.00 -76 78	6.00 -84 122	6.00 -84 122	6.00 -82 728	6.00 -74 250	6.00 -74 250
5.00 -59 48	5.00 -63 60	5.00 -63 60	5.00 -74 80	5.00 -74 80	5.00 -85 140	5.00 -85 140	5.00 -80 222	5.00 -72 247	5.00 -72 247
4.00 -58 53	4.00 -67 65	4.00 -67 65	4.00 -74 82	4.00 -74 82	4.00 -84 131	4.00 -84 131	4.00 -81 222	4.00 -72 243	4.00 -72 243
3.00 -57 45	3.00 -67 62	3.00 -67 62	3.00 -77 82	3.00 -77 82	3.00 -84 146	3.00 -84 146	3.00 -79 235	3.00 -69 250	3.00 -69 250
2.00 -57 48	2.00 -64 57	2.00 -64 57	2.00 -77 74	2.00 -77 74	2.00 -86 155	2.00 -86 155	2.00 -77 232	2.00 -65 254	2.00 -65 254
1.00 -52 46	1.00 -65 57	1.00 -65 57	1.00 -77 76	1.00 -77 76	1.00 -85 159	1.00 -85 159	1.00 -76 232	1.00 -65 252	1.00 -65 252
1.00 -53 47	1.00 -65 59	1.00 -65 59	1.00 -77 78	1.00 -77 78	1.00 -85 154	1.00 -85 154	1.00 -77 232	1.00 -65 252	1.00 -65 252
1.00 -51 46	1.00 -64 58	1.00 -64 58	1.00 -76 75	1.00 -76 75	1.00 -86 155	1.00 -86 155	1.00 -76 235	1.00 -64 254	1.00 -64 254
1.00 -51 46	1.00 -64 56	1.00 -64 56	1.00 -77 74	1.00 -77 74	1.00 -85 164	1.00 -85 164	1.00 -76 236	1.00 -63 254	1.00 -63 254
1.00 -51 46	1.00 -64 58	1.00 -64 58	1.00 -76 76	1.00 -76 76	1.00 -85 159	1.00 -85 159	1.00 -76 236	1.00 -63 254	1.00 -63 254
1.00 -51 46	1.00 -63 56	1.00 -63 56	1.00 -77 73	1.00 -77 73	1.00 -86 166	1.00 -86 166	1.00 -76 236	1.00 -63 254	1.00 -63 254
1.00 -50 45	1.00 -63 57	1.00 -63 57	1.00 -76 75	1.00 -76 75	1.00 -85 164	1.00 -85 164	1.00 -76 235	1.00 -62 255	1.00 -62 255
1.00 -50 45	1.00 -62 55	1.00 -62 55	1.00 -77 72	1.00 -77 72	1.00 -85 172	1.00 -85 172	1.00 -74 237	1.00 -61 254	1.00 -61 254
1.00 -48 46	1.00 -62 56	1.00 -62 56	1.00 -76 72	1.00 -76 72	1.00 -86 171	1.00 -86 171	1.00 -74 238	1.00 -60 255	1.00 -60 255
1.00 -48 46	1.00 -62 55	1.00 -62 55	1.00 -76 72	1.00 -76 72	1.00 -85 172	1.00 -85 172	1.00 -73 238	1.00 -59 256	1.00 -59 256
1.00 -47 44	1.00 -61 55	1.00 -61 55	1.00 -76 71	1.00 -76 71	1.00 -85 176	1.00 -85 176	1.00 -72 239	1.00 -57 256	1.00 -57 256
1.00 -46 44	1.00 -60 53	1.00 -60 53	1.00 -76 69	1.00 -76 69	1.00 -85 184	1.00 -85 184	1.00 -71 240	1.00 -56 256	1.00 -56 256
1.00 -45 42	1.00 -60 53	1.00 -60 53	1.00 -76 70	1.00 -76 70	1.00 -85 185	1.00 -85 185	1.00 -71 240	1.00 -55 257	1.00 -55 257
1.00 -43 42	1.00 -59 52	1.00 -59 52	1.00 -76 67	1.00 -76 67	1.00 -85 192	1.00 -85 192	1.00 -70 241	1.00 -52 257	1.00 -52 257
1.00 -42 42	1.00 -59 51	1.00 -59 51	1.00 -76 66	1.00 -76 66	1.00 -85 196	1.00 -85 196	1.00 -68 241	1.00 -50 258	1.00 -50 258
1.00 -41 41	1.00 -59 49	1.00 -59 49	1.00 -75 65	1.00 -75 65	1.00 -84 202	1.00 -84 202	1.00 -67 242	1.00 -47 258	1.00 -47 258
1.00 -40 39	1.00 -59 47	1.00 -59 47	1.00 -75 63	1.00 -75 63	1.00 -84 207	1.00 -84 207	1.00 -64 242	1.00 -43 259	1.00 -43 259
1.00 -38 37	1.00 -58 45	1.00 -58 45	1.00 -75 59	1.00 -75 59	1.00 -84 212	1.00 -84 212	1.00 -61 242	1.00 -38 259	1.00 -38 259
1.00 -38 37	1.00 -58 45	1.00 -58 45	1.00 -74 53	1.00 -74 53	1.00 -81 219	1.00 -81 219	1.00 -56 241	1.00 -35 259	1.00 -35 259
1.00 -36 36	1.00 -58 40	1.00 -58 40	1.00 -74 53	1.00 -74 53	1.00 -81 219	1.00 -81 219	1.00 -56 241	1.00 -35 259	1.00 -35 259
1.00 -35 32	1.00 -57 38	1.00 -57 38	1.00 -74 51	1.00 -74 51	1.00 -80 218	1.00 -80 218	1.00 -54 241	1.00 -32 259	1.00 -32 259
1.00 -35 31	1.00 -57 37	1.00 -57 37	1.00 -74 51	1.00 -74 51	1.00 -80 219	1.00 -80 219	1.00 -54 241	1.00 -32 259	1.00 -32 259
1.00 -34 31	1.00 -57 37	1.00 -57 37	1.00 -74 49	1.00 -74 49	1.00 -79 219	1.00 -79 219	1.00 -51 240	1.00 -31 259	1.00 -31 259
1.00 -33 30	1.00 -56 36	1.00 -56 36	1.00 -74 48	1.00 -74 48	1.00 -79 218	1.00 -79 218	1.00 -51 240	1.00 -31 259	1.00 -31 259
1.00 -32 29	1.00 -56 33	1.00 -56 33	1.00 -74 46	1.00 -74 46	1.00 -78 218	1.00 -78 218	1.00 -49 237	1.00 -31 258	1.00 -31 258
1.00 -31 29	1.00 -56 33	1.00 -56 33	1.00 -74 45	1.00 -74 45	1.00 -78 218	1.00 -78 218	1.00 -49 237	1.00 -31 258	1.00 -31 258
1.00 -30 29	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -29 28	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -28 27	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -27 26	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -26 25	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -25 24	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -24 23	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -23 22	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -22 21	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -21 20	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -20 19	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -19 18	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -18 17	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -17 16	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -16 15	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -15 14	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -14 13	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -13 12	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -12 11	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -11 10	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -10 09	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -9 08	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -8 07	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -7 06	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -6 05	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -5 04	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -4 03	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -3 02	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -2 01	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 -1 00	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258
1.00 00 00	1.00 -56 33	1.00 -56 33	1.00 -74 43	1.00 -74 43	1.00 -77 215	1.00 -77 215	1.00 -47 236	1.00 -31 258	1.00 -31 258

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC		GEOGRAPHIC	
LAT. = -75.00 LONG. = 180.00		LAT. = -75.00 LONG. = 145.00		LAT. = -75.00 LONG. = 210.00		LAT. = -75.00 LONG. = 275.00		LAT. = -75.00 LONG. = 240.00		LAT. = -75.00 LONG. = 75.00	
RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG	RIG ASYMPTOTIC (GV)	LAT LONG
10.06	-69 259	11.10	-62 -68	10.00	-54 -75	10.00	-47 -64	10.00	-47 -64	10.00	-44 -51
9.00	-69 258	1.20	-62 -68	9.00	-54 -76	9.00	-47 -64	9.00	-47 -64	9.00	-44 -51
8.00	-69 268	1.30	-62 -68	8.00	-54 -74	8.00	-47 -64	8.00	-47 -64	8.00	-44 -51
7.00	-69 263	1.00	-60 -61	7.00	-53 -71	7.00	-45 -60	7.00	-45 -60	7.00	-44 -51
6.00	-65 264	1.30	-57 -61	6.00	-46 -69	6.00	-40 -58	6.00	-40 -58	6.00	-42 -54
5.00	-63 263	1.30	-54 -64	5.00	-44 -71	5.00	-35 -54	5.00	-35 -54	5.00	-34 -58
4.00	-62 265	1.00	-53 -64	4.00	-43 -70	4.00	-34 -54	4.00	-34 -54	4.00	-34 -58
3.00	-58 265	1.00	-48 -67	3.00	-37 -70	3.00	-27 -57	3.00	-27 -57	3.00	-34 -58
2.00	-53 268	1.00	-41 -79	2.00	-29 -65	2.00	-17 -51	2.00	-17 -51	2.00	-34 -58
1.90	-52 267	1.30	-40 -79	1.90	-27 -65	1.90	-14 -50	1.90	-14 -50	1.90	-34 -58
1.80	-52 267	1.30	-34 -79	1.80	-26 -66	1.80	-12 -51	1.80	-12 -51	1.80	-34 -58
1.70	-51 269	1.70	-34 -78	1.70	-26 -64	1.70	-12 -50	1.70	-12 -50	1.70	-34 -58
1.60	-50 268	1.50	-34 -76	1.60	-23 -63	1.60	-10 -50	1.60	-10 -50	1.60	-34 -58
1.50	-50 268	1.50	-35 -76	1.50	-22 -64	1.50	-7 -47	1.50	-18 -50	1.50	-34 -58
1.40	-48 269	1.40	-34 -77	1.40	-21 -62	1.40	-6 -46	1.40	-18 -50	1.40	-34 -58
1.30	-48 269	1.40	-33 -77	1.30	-18 -62	1.30	-3 -45	1.30	-18 -51	1.30	-34 -58
1.20	-46 269	1.70	-31 -76	1.20	-16 -60	1.20	-1 -42	1.20	-16 -51	1.20	-34 -58
1.10	-45 270	1.10	-30 -76	1.10	-14 -59	1.10	0 -39	1.10	-14 -51	1.10	-34 -58
1.00	-44 270	1.00	-29 -75	1.00	-11 -58	1.00	0 -35	1.00	-14 -51	1.00	-34 -58
0.90	-42 271	1.30	-29 -74	1.00	-8 -56	1.00	0 -30	1.00	-14 -51	1.00	-34 -58
0.80	-40 271	1.0	-23 -72	0.80	-5 -53	0.80	13 -23	1.00	1 327	1.00	-34 -58
0.70	-38 272	0.70	-14 -71	0.70	0 -49	0.70	16 -18	1.70	2 327	1.70	-34 -58
0.60	-35 273	0.30	-11 -70	0.60	5 -44	0.60	17 -5	1.60	3 330	1.60	-34 -58
0.50	-31 274	0.50	-11 -67	0.50	11 -34	0.50	9 37	1.50	7 333	1.50	-34 -58
0.40	-27 275	0.40	-4 -62	0.40	16 -18	0.40	6 44	1.40	6 335	1.40	-34 -58
0.30	-20 277	0.30	5 -54	0.30	6 20	0.40	4 48	1.30	11 339	1.30	-34 -58
0.20	-10 281	0.20	17 -28	0.20	3 37	0.47	2 55	1.20	13 343	1.20	-34 -58
0.10	11 294	0.10	14 -15	0.20	-2 49	0.46	-2 64	1.10	16 351	1.10	-34 -58
0.00	15 300	0.10	14 -15	0.27	-6 64	0.45	-4 72	1.00	18 359	1.00	-34 -58
0.00	19 303	0.17	17 -7	0.26	-9 93	0.44	-7 80	0.90	18 31	0.90	-34 -58
0.00	24 313	0.16	14 3	0.25	-11 407	0.43	-6 105	0.80	16 30	0.80	-34 -58
0.06	27 333	0.15	3 19	0.24	13 544	0.47	14 156	0.70	4 61	0.70	-34 -58
0.05	-8 462	0.14	-7 45	0.23	0 277	0.41	-14 377	0.64	2 65	0.70	-34 -58
0.04	F	0.13	3 269	0.22	N	0.40	4 487	0.67	0 71	0.77	-34 -58
		0.17	13 196			0.39	15 434	0.66	-6 90	0.76	-34 -58
		0.11	F			0.36	-3 239	0.64	-6 97	0.74	-34 -58
						0.37	-5 240	0.64	-6 106	0.73	-34 -58
						0.36	10 2616	0.63	-1 124	0.72	-34 -58
						0.35	F	0.62	13 174	0.71	-34 -58
								0.61	-7 249		
								0.60	15 388		
								0.59	10 419		
								0.58	R		

TABLE 41 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC				GEOGRAPHIC				GEOGRAPHIC				GEOGRAPHIC				
LAT.		LONG.		LAT.		LONG.		LAT.		LONG.		LAT.		LONG.		
ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		ASYMPTOTIC		
RIC	RIC	RIC	RIC	RIC	RIC	RIC	RIC	RIC	RIC	RIC	RIC	RIC	RIC	RIC	RIC	
(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	(GV)	
29.00	-62	-14	20.00	-48	-6	20.00	-30	1	20.00	-30	0	20.00	-30	15	20.00	-30
13.00	-40	-15	10.00	-30	-6	10.00	-30	0	10.00	-30	0	10.00	-30	15	10.00	-30
15.00	-30	-15	10.00	-30	-6	10.00	-30	0	10.00	-30	0	10.00	-30	15	10.00	-30
17.00	-30	-17	17.00	-33	-9	17.00	-32	5	17.00	-32	5	17.00	-32	11	17.00	-32
15.00	-31	-16	16.00	-31	-10	16.00	-30	3	16.00	-30	3	16.00	-30	10	16.00	-30
15.00	-31	-19	15.00	-29	-12	15.00	-28	5	15.00	-28	2	15.00	-28	10	15.00	-28
15.00	-21	-23	16.00	-21	-14	16.00	-25	7	16.00	-25	0	16.00	-25	10	16.00	-25
15.00	-26	-23	15.00	-24	-15	15.00	-23	4	15.00	-24	-2	15.00	-24	4	15.00	-24
15.00	-24	-25	12.00	-22	-17	12.00	-21	11	12.00	-22	4	12.00	-22	4	12.00	-22
11.00	-21	-27	11.00	-20	-20	11.00	-20	13	11.00	-21	7	11.00	-21	3	11.00	-21
10.00	-22	-28	10.00	-19	-21	10.00	-19	15	10.00	-20	9	10.00	-20	3	10.00	-20
1.00	-22	-29	9.00	-20	-23	9.00	-20	15	9.00	-20	10	9.00	-20	3	9.00	-20
3.00	-21	-29	6.00	-20	-22	6.00	-20	15	6.00	-20	10	6.00	-20	3	6.00	-20
7.00	-23	-26	7.00	-21	-19	7.00	-20	15	7.00	-20	10	7.00	-20	3	7.00	-20
5.00	-15	-31	6.00	-16	-14	6.00	-16	0	6.00	-16	0	6.00	-16	0	6.00	-16
1.00	-7	-19	5.00	-5	-11	5.00	-5	0	5.00	-7	0	5.00	-7	0	5.00	-7
1.00	-5	-19	4.00	0	-12	4.00	1	-6	4.00	-1	-2	4.00	-1	-2	4.00	-1
5.00	7	-8	3.00	12	0	3.00	11	4	3.00	6	0	3.00	6	0	3.00	6
2.00	11	-7	2.00	14	1	2.00	13	5	2.00	23	25	2.00	23	25	2.00	23
2.00	12	-7	2.00	15	2	2.00	15	6	2.00	23	26	2.00	23	26	2.00	23
1.70	12	-6	2.70	15	2	2.70	16	7	2.70	16	7	2.70	16	7	2.70	16
1.50	12	-5	2.60	15	3	2.60	15	8	2.60	15	8	2.60	15	8	2.60	15
1.50	12	-3	2.50	15	5	2.50	15	9	2.50	15	9	2.50	15	9	2.50	15
1.50	13	-1	2.40	16	7	2.40	16	11	2.40	16	11	2.40	16	11	2.40	16
2.00	16	3	2.30	18	11	2.30	18	11	2.30	18	11	2.30	18	11	2.30	18
2.00	17	7	2.20	21	16	2.20	21	19	2.20	21	19	2.20	21	19	2.20	21
2.00	18	11	2.10	24	21	2.10	24	23	2.10	24	23	2.10	24	23	2.10	24
2.00	21	13	2.00	24	26	2.00	25	27	2.00	25	27	2.00	26	28	2.00	26
1.50	21	16	1.90	23	27	1.90	24	30	1.90	24	30	1.90	25	31	1.90	25
1.00	22	23	1.80	25	44	1.80	26	44	1.80	26	44	1.80	27	45	1.80	27
1.70	24	13	1.70	25	44	1.70	26	44	1.70	26	44	1.70	27	45	1.70	27
1.00	22	41	1.60	21	56	1.60	21	56	1.60	21	56	1.60	22	57	1.60	22
1.10	20	46	1.50	18	62	1.50	21	62	1.50	21	62	1.50	22	63	1.50	22
1.40	15	67	1.40	12	81	1.40	16	76	1.40	16	76	1.40	17	77	1.40	17
1.10	4	85	1.30	4	110	1.30	3	100	1.30	4	100	1.30	4	100	1.30	4
1.20	4	86	1.20	4	112	1.20	-6	127	1.20	-6	127	1.20	-6	127	1.20	-6
1.20	3	88	1.20	-5	115	1.20	-5	119	1.20	-5	119	1.20	-5	119	1.20	-5
1.20	3	90	1.20	-5	117	1.20	-5	118	1.20	-5	118	1.20	-5	118	1.20	-5
1.20	2	93	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20	-6
1.20	1	96	1.20	-6	124	1.20	-6	124	1.20	-6	124	1.20</				

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD LOCATIONS
 WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (GUF07-08)

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.8)

GEOGRAPHIC LAT. = -80.00 LONG. = 90.00	GEOGRAPHIC LAT. = -80.00 LONG. = 105.00	GEOGRAPHIC LAT. = -80.00 LONG. = 120.00	GEOGRAPHIC LAT. = -80.00 LONG. = 135.00	GEOGRAPHIC LAT. = -80.00 LONG. = 150.00	GEOGRAPHIC LAT. = -80.00 LONG. = 165.00
RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG	RIG ASYMPTOTIC (GV) LAT LONG
18.00 -07 25	13.00 -73 26	10.00 -79 21	10.00 -83 356	10.00 -82 313	10.00 -78 295
9.00 -08 27	3.00 -74 29	3.00 -79 25	9.00 -84 8	9.00 -83 312	9.00 -78 294
8.00 -07 32	3.00 -71 34	8.00 -79 31	8.00 -83 9	8.00 -83 318	8.00 -78 297
7.00 -08 34	6.00 -71 35	7.00 -77 32	7.00 -82 11	7.00 -82 326	7.00 -78 303
6.00 -08 38	5.00 -63 30	6.00 -75 24	6.00 -80 1	6.00 -80 323	6.00 -75 384
5.00 -08 23	5.00 -63 23	5.00 -76 14	5.00 -80 347	5.00 -79 311	5.00 -73 294
4.00 -08 20	4.00 -63 28	4.00 -76 21	4.00 -80 355	4.00 -79 316	4.00 -73 289
3.00 -08 22	3.00 -68 22	3.00 -75 13	3.00 -80 344	3.00 -77 308	3.00 -70 295
2.00 -05 22	2.00 -68 20	2.00 -72 9	2.00 -76 340	2.00 -74 309	2.00 -66 297
1.00 -05 20	1.00 -64 16	1.00 -72 6	1.00 -77 337	1.00 -73 306	1.00 -66 295
1.00 -06 20	1.00 -61 16	1.00 -73 8	1.00 -77 339	1.00 -74 307	1.00 -66 295
1.00 -05 22	1.00 -64 20	1.00 -72 9	1.00 -76 340	1.00 -73 309	1.00 -66 292
1.00 -05 28	1.00 -63 17	1.00 -72 5	1.00 -76 336	1.00 -72 302	1.00 -64 296
1.00 -05 21	1.00 -64 17	1.00 -72 6	1.00 -76 337	1.00 -72 307	1.00 -64 295
1.00 -05 21	1.00 -64 18	1.00 -71 5	1.00 -75 337	1.00 -71 307	1.00 -63 296
1.00 -05 28	1.00 -63 18	1.00 -71 4	1.00 -75 335	1.00 -71 306	1.00 -63 285
1.00 -05 28	1.00 -61 16	1.00 -70 3	1.00 -74 334	1.00 -70 306	1.00 -61 294
1.00 -05 18	1.00 -71 16	1.00 -70 4	1.00 -74 335	1.00 -70 307	1.00 -61 296
1.00 -05 17	1.00 -61 15	1.00 -70 3	1.00 -74 334	1.00 -69 306	1.00 -60 296
1.00 -05 17	1.00 -60 14	1.00 -69 2	1.00 -73 333	1.00 -68 305	1.00 -58 295
1.00 -05 17	1.00 -59 14	1.00 -68 0	1.00 -72 331	1.00 -67 305	1.00 -57 296
1.00 -05 17	1.00 -59 14	1.00 -68 0	1.00 -71 330	1.00 -66 304	1.00 -56 295
1.00 -05 15	1.00 -57 13	1.00 -66 359	1.00 -70 329	1.00 -65 304	1.00 -54 295
1.00 -05 15	1.00 -57 13	1.00 -66 358	1.00 -69 328	1.00 -64 303	1.00 -53 295
1.00 -05 14	1.00 -55 8	1.00 -64 354	1.00 -67 326	1.00 -63 302	1.00 -49 295
1.00 -05 14	1.00 -53 7	1.00 -62 351	1.00 -65 323	1.00 -61 300	1.00 -44 294
1.00 -05 14	1.00 -50 4	1.00 -59 348	1.00 -62 320	1.00 -58 299	1.00 -39 294
1.00 -05 14	1.00 -46 4	1.00 -56 342	1.00 -57 315	1.00 -54 296	1.00 -27 293
1.00 -05 14	1.00 -40 358	1.00 -54 342	1.00 -56 314	1.00 -46 296	1.00 -27 293
1.00 -05 14	1.00 -33 358	1.00 -54 342	1.00 -56 314	1.00 -45 295	1.00 -25 292
1.00 -05 14	1.00 -30 357	1.00 -53 340	1.00 -56 313	1.00 -44 294	1.00 -23 292
1.00 -05 14	1.00 -26 356	1.00 -52 340	1.00 -55 312	1.00 -43 294	1.00 -21 291
1.00 -05 14	1.00 -23 355	1.00 -51 338	1.00 -54 311	1.00 -41 293	1.00 -19 291
1.00 -05 14	1.00 -19 353	1.00 -51 336	1.00 -53 310	1.00 -40 291	1.00 -15 290
1.00 -05 14	1.00 -16 353	1.00 -50 337	1.00 -52 308	1.00 -38 290	1.00 -12 289
1.00 -05 14	1.00 -13 351	1.00 -49 335	1.00 -51 306	1.00 -36 288	1.00 -8 287
1.00 -05 14	1.00 -10 349	1.00 -48 332	1.00 -50 306	1.00 -35 288	1.00 -2 285
1.00 -05 14	1.00 -07 346	1.00 -47 330	1.00 -49 303	1.00 -34 285	1.00 -2 285
1.00 -05 14	1.00 -04 342	1.00 -46 326	1.00 -48 299	1.00 -32 281	1.00 -3 288

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -80.00 LONG. = 180.00	GEOGRAPHIC LAT. = -80.00 LONG. = 210.00	GEOGRAPHIC LAT. = -80.00 LONG. = 240.00	GEOGRAPHIC LAT. = -80.00 LONG. = 255.00
ASYMPTOTIC (GV) LAT LONG	ASYMPTOTIC (GV) LAT LONG	ASYMPTOTIC (GV) LAT LONG	ASYMPTOTIC (GV) LAT LONG
10.00 -72 293	10.00 -60 -59	10.00 -54 -53	10.00 -48 -47
9.00 -72 292	9.00 -60 -60	9.00 -54 -54	9.00 -48 -48
8.00 -72 294	8.00 -60 -60	8.00 -54 -52	8.00 -48 -48
7.00 -71 299	7.00 -59 -55	7.00 -53 -49	7.00 -47 -43
6.00 -68 300	6.00 -55 -53	6.00 -48 -47	6.00 -43 -40
5.00 -62 294	5.00 -51 -57	5.00 -44 -50	5.00 -37 -41
4.00 -66 296	4.00 -51 -56	4.00 -44 -53	4.00 -37 -43
3.00 -62 294	3.00 -45 -57	3.00 -37 -50	3.00 -29 -43
2.00 -57 296	2.00 -38 -54	2.00 -29 -46	2.00 -21 -38
1.00 -56 295	1.00 -37 -54	1.00 -27 -46	1.00 -18 -37
1.00 -57 295	1.00 -36 -55	1.00 -26 -47	1.00 -16 -38
1.00 -56 296	1.00 -36 -54	1.00 -26 -46	1.00 -16 -38
1.00 -56 295	1.00 -34 -53	1.00 -24 -45	1.00 -14 -36
1.00 -54 295	1.00 -33 -54	1.00 -22 -44	1.00 -11 -35
1.00 -51 296	1.00 -32 -53	1.00 -21 -44	1.00 -11 -35
1.00 -52 295	1.00 -33 -53	1.00 -18 -44	1.00 -7 -33
1.00 -51 296	1.00 -32 -52	1.00 -17 -43	1.00 -6 -32
1.00 -50 295	1.00 -27 -52	1.00 -16 -42	1.00 -2 -30
1.00 -49 296	1.00 -24 -51	1.00 -11 -41	1.00 1 -27
1.00 -47 296	1.00 -21 -51	1.00 -8 -39	1.00 5 -24
1.00 -45 297	1.00 -19 -50	1.00 -5 -37	1.00 9 -20
1.00 -43 296	1.00 -15 -46	1.00 0 -33	1.00 12 -14
1.00 -41 296	1.00 -10 -46	1.00 5 -29	1.00 17 -4
1.00 -37 297	1.00 -5 -43	1.00 11 -21	1.00 20 15
1.00 -35 297	1.00 -2 -38	1.00 16 -16	1.00 28 10
1.00 -33 297	1.00 12 -27	1.00 16 -12	1.00 30 8
1.00 -31 297	1.00 19 19	1.00 14 38	1.00 32 7
1.00 -29 299	1.00 16 30	1.00 11 46	1.00 37 -2
1.00 -27 304	1.00 9 44	1.00 6 57	1.00 40 10
1.00 -25 308	1.00 5 69	1.00 1 71	1.00 43 6
1.00 -23 313	1.00 0 155	1.00 0 91	1.00 46 3
1.00 -21 319	1.00 14 22	1.00 10 204	1.00 49 18
1.00 -19 331	1.00 11 131	1.00 12 916	1.00 51 0
1.00 -17 340	1.00 12 23	1.00 14 312	1.00 53 18
1.00 -15 347	1.00 10 27	1.00 16 610	1.00 55 39
1.00 -13 357	1.00 8 37	1.00 18 888	1.00 57 7
1.00 -11 366	1.00 6 4	1.00 20 1100	1.00 59 1
1.00 -9 377	1.00 4 1	1.00 22 1300	1.00 61 1

TABLE A1 (CONTINUED)
ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC			GEOGRAPHIC		
LAT. = -80.00			LAT. = -80.00			LAT. = -80.00			LAT. = -80.00			LAT. = -80.00		
LONG. = 270.00			LONG. = 300.00			LONG. = 315.00			LONG. = 330.00			LONG. = 345.00		
RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC	RIG ASYMPTOTIC
(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG	(GV) LAT LONG
18.00 -30 -35	11.00 -35 -29	10.00 -33 -23	10.00 -31 -17	10.00 -29 -11	10.00 -27 -5	10.00 -25 1	10.00 -23 5	10.00 -21 9	10.00 -19 13	10.00 -17 17	10.00 -15 21	10.00 -13 25	10.00 -11 29	10.00 -9 33
9.00 -30 -35	1.00 -35 -29	9.00 -34 -24	9.00 -32 -18	9.00 -30 -12	9.00 -28 -6	9.00 -26 0	9.00 -24 4	9.00 -22 8	9.00 -20 12	9.00 -18 16	9.00 -16 20	9.00 -14 24	9.00 -12 28	9.00 -10 32
0.00 -30 -35	1.00 -35 -29	0.00 -35 -23	0.00 -33 -17	0.00 -31 -11	0.00 -29 -5	0.00 -27 1	0.00 -25 5	0.00 -23 9	0.00 -21 13	0.00 -19 17	0.00 -17 21	0.00 -15 25	0.00 -13 29	0.00 -11 33
7.00 -30 -35	1.00 -35 -29	7.00 -34 -20	7.00 -32 -14	7.00 -30 -8	7.00 -28 -2	7.00 -26 4	7.00 -24 8	7.00 -22 12	7.00 -20 16	7.00 -18 20	7.00 -16 24	7.00 -14 28	7.00 -12 32	7.00 -10 36
6.00 -30 -35	1.00 -35 -29	6.00 -34 -16	6.00 -32 -10	6.00 -30 -4	6.00 -28 2	6.00 -26 6	6.00 -24 10	6.00 -22 14	6.00 -20 18	6.00 -18 22	6.00 -16 26	6.00 -14 30	6.00 -12 34	6.00 -10 38
5.00 -30 -35	1.00 -35 -29	5.00 -34 -12	5.00 -32 -6	5.00 -30 0	5.00 -28 4	5.00 -26 8	5.00 -24 12	5.00 -22 16	5.00 -20 20	5.00 -18 24	5.00 -16 28	5.00 -14 32	5.00 -12 36	5.00 -10 40
4.00 -30 -35	1.00 -35 -29	4.00 -34 -8	4.00 -32 -2	4.00 -30 4	4.00 -28 8	4.00 -26 12	4.00 -24 16	4.00 -22 20	4.00 -20 24	4.00 -18 28	4.00 -16 32	4.00 -14 36	4.00 -12 40	4.00 -10 44
3.00 -30 -35	1.00 -35 -29	3.00 -34 -4	3.00 -32 0	3.00 -30 4	3.00 -28 8	3.00 -26 12	3.00 -24 16	3.00 -22 20	3.00 -20 24	3.00 -18 28	3.00 -16 32	3.00 -14 36	3.00 -12 40	3.00 -10 44
2.00 -30 -35	1.00 -35 -29	2.00 -34 0	2.00 -32 4	2.00 -30 8	2.00 -28 12	2.00 -26 16	2.00 -24 20	2.00 -22 24	2.00 -20 28	2.00 -18 32	2.00 -16 36	2.00 -14 40	2.00 -12 44	2.00 -10 48
1.00 -30 -35	1.00 -35 -29	1.00 -34 4	1.00 -32 8	1.00 -30 12	1.00 -28 16	1.00 -26 20	1.00 -24 24	1.00 -22 28	1.00 -20 32	1.00 -18 36	1.00 -16 40	1.00 -14 44	1.00 -12 48	1.00 -10 52
0.00 -30 -35	1.00 -35 -29	0.00 -34 8	0.00 -32 12	0.00 -30 16	0.00 -28 20	0.00 -26 24	0.00 -24 28	0.00 -22 32	0.00 -20 36	0.00 -18 40	0.00 -16 44	0.00 -14 48	0.00 -12 52	0.00 -10 56
1.00 -30 -35	1.00 -35 -29	1.00 -34 12	1.00 -32 16	1.00 -30 20	1.00 -28 24	1.00 -26 28	1.00 -24 32	1.00 -22 36	1.00 -20 40	1.00 -18 44	1.00 -16 48	1.00 -14 52	1.00 -12 56	1.00 -10 60
2.00 -30 -35	1.00 -35 -29	2.00 -34 16	2.00 -32 20	2.00 -30 24	2.00 -28 28	2.00 -26 32	2.00 -24 36	2.00 -22 40	2.00 -20 44	2.00 -18 48	2.00 -16 52	2.00 -14 56	2.00 -12 60	2.00 -10 64
3.00 -30 -35	1.00 -35 -29	3.00 -34 20	3.00 -32 24	3.00 -30 28	3.00 -28 32	3.00 -26 36	3.00 -24 40	3.00 -22 44	3.00 -20 48	3.00 -18 52	3.00 -16 56	3.00 -14 60	3.00 -12 64	3.00 -10 68
4.00 -30 -35	1.00 -35 -29	4.00 -34 24	4.00 -32 28	4.00 -30 32	4.00 -28 36	4.00 -26 40	4.00 -24 44	4.00 -22 48	4.00 -20 52	4.00 -18 56	4.00 -16 60	4.00 -14 64	4.00 -12 68	4.00 -10 72
5.00 -30 -35	1.00 -35 -29	5.00 -34 28	5.00 -32 32	5.00 -30 36	5.00 -28 40	5.00 -26 44	5.00 -24 48	5.00 -22 52	5.00 -20 56	5.00 -18 60	5.00 -16 64	5.00 -14 68	5.00 -12 72	5.00 -10 76
6.00 -30 -35	1.00 -35 -29	6.00 -34 32	6.00 -32 36	6.00 -30 40	6.00 -28 44	6.00 -26 48	6.00 -24 52	6.00 -22 56	6.00 -20 60	6.00 -18 64	6.00 -16 68	6.00 -14 72	6.00 -12 76	6.00 -10 80
7.00 -30 -35	1.00 -35 -29	7.00 -34 36	7.00 -32 40	7.00 -30 44	7.00 -28 48	7.00 -26 52	7.00 -24 56	7.00 -22 60	7.00 -20 64	7.00 -18 68	7.00 -16 72	7.00 -14 76	7.00 -12 80	7.00 -10 84
8.00 -30 -35	1.00 -35 -29	8.00 -34 40	8.00 -32 44	8.00 -30 48	8.00 -28 52	8.00 -26 56	8.00 -24 60	8.00 -22 64	8.00 -20 68	8.00 -18 72	8.00 -16 76	8.00 -14 80	8.00 -12 84	8.00 -10 88
9.00 -30 -35	1.00 -35 -29	9.00 -34 44	9.00 -32 48	9.00 -30 52	9.00 -28 56	9.00 -26 60	9.00 -24 64	9.00 -22 68	9.00 -20 72	9.00 -18 76	9.00 -16 80	9.00 -14 84	9.00 -12 88	9.00 -10 92
10.00 -30 -35	1.00 -35 -29	10.00 -34 48	10.00 -32 52	10.00 -30 56	10.00 -28 60	10.00 -26 64	10.00 -24 68	10.00 -22 72	10.00 -20 76	10.00 -18 80	10.00 -16 84	10.00 -14 88	10.00 -12 92	10.00 -10 96
11.00 -30 -35	1.00 -35 -29	11.00 -34 52	11.00 -32 56	11.00 -30 60	11.00 -28 64	11.00 -26 68	11.00 -24 72	11.00 -22 76	11.00 -20 80	11.00 -18 84	11.00 -16 88	11.00 -14 92	11.00 -12 96	11.00 -10 100
12.00 -30 -35	1.00 -35 -29	12.00 -34 56	12.00 -32 60	12.00 -30 64	12.00 -28 68	12.00 -26 72	12.00 -24 76	12.00 -22 80	12.00 -20 84	12.00 -18 88	12.00 -16 92	12.00 -14 96	12.00 -12 100	12.00 -10 104
13.00 -30 -35	1.00 -35 -29	13.00 -34 60	13.00 -32 64	13.00 -30 68	13.00 -28 72	13.00 -26 76	13.00 -24 80	13.00 -22 84	13.00 -20 88	13.00 -18 92	13.00 -16 96	13.00 -14 100	13.00 -12 104	13.00 -10 108
14.00 -30 -35	1.00 -35 -29	14.00 -34 64	14.00 -32 68	14.00 -30 72	14.00 -28 76	14.00 -26 80	14.00 -24 84	14.00 -22 88	14.00 -20 92	14.00 -18 96	14.00 -16 100	14.00 -14 104	14.00 -12 108	14.00 -10 112
15.00 -30 -35	1.00 -35 -29	15.00 -34 68	15.00 -32 72	15.00 -30 76	15.00 -28 80	15.00 -26 84	15.00 -24 88	15.00 -22 92	15.00 -20 96	15.00 -18 100	15.00 -16 104	15.00 -14 108	15.00 -12 112	15.00 -10 116
16.00 -30 -35	1.00 -35 -29	16.00 -34 72	16.00 -32 76	16.00 -30 80	16.00 -28 84	16.00 -26 88	16.00 -24 92	16.00 -22 96	16.00 -20 100	16.00 -18 104	16.00 -16 108	16.00 -14 112	16.00 -12 116	16.00 -10 120
17.00 -30 -35	1.00 -35 -29	17.00 -34 76	17.00 -32 80	17.00 -30 84	17.00 -28 88	17.00 -26 92	17.00 -24 96	17.00 -22 100	17.00 -20 104	17.00 -18 108	17.00 -16 112	17.00 -14 116	17.00 -12 120	17.00 -10 124
18.00 -30 -35	1.00 -35 -29	18.00 -34 80	18.00 -32 84	18.00 -30 88	18.00 -28 92	18.00 -26 96	18.00 -24 100	18.00 -22 104	18.00 -20 108	18.00 -18 112	18.00 -16 116	18.00 -14 120	18.00 -12 124	18.00 -10 128
19.00 -30 -35	1.00 -35 -29	19.00 -34 84	19.00 -32 88	19.00 -30 92	19.00 -28 96	19.00 -26 100	19.00 -24 104	19.00 -22 108	19.00 -20 112	19.00 -18 116	19.00 -16 120	19.00 -14 124	19.00 -12 128	19.00 -10 132
20.00 -30 -35	1.00 -35 -29	20.00 -34 88	20.00 -32 92	20.00 -30 96	20.00 -28 100	20.00 -26 104	20.00 -24 108	20.00 -22 112	20.00 -20 116	20.00 -18 120	20.00 -16 124	20.00 -14 128	20.00 -12 132	20.00 -10 136
21.00 -30 -35	1.00 -35 -29	21.00 -34 92	21.00 -32 96	21.00 -30 100	21.00 -28 104	21.00 -26 108	21.00 -24 112	21.00 -22 116	21.00 -20 120	21.00 -18 124	21.00 -16 128	21.00 -14 132	21.00 -12 136	21.00 -10 140
22.00 -30 -35	1.00 -35 -29	22.00 -34 96	22.00 -32 100	22.00 -30 104	22.00 -28 108	22.00 -26 112	22.00 -24 116	22.00 -22 120	22.00 -20 124	22.00 -18 128	22.00 -16 132	22.00 -14 136	22.00 -12 140	22.00 -10 144
23.00 -30 -35	1.00 -35 -29	23.00 -34 100	23.00 -32 104	23.00 -30 108	23.00 -28 112	23.00 -26 116	23.00 -24 120	23.00 -22 124	23.00 -20 128	23.00 -18 132	23.00 -16 136	23.00 -14 140	23.00 -12 144	23.00 -10 148
24.00 -30 -35	1.00 -35 -29	24.00 -34 104	24.00 -32 108	24.00 -30 112	24.00 -28 116	24.00 -26 120	24.00 -24 124	24.00 -22 128	24.00 -20 132	24.00 -18 136	24.00 -16 140	24.00 -14 144	24.00 -12 148	24.00 -10 152
25.00 -30 -35	1.00 -35 -29	25.00 -34 108	25.00 -32 112	25.00 -30 116	25.00 -28 120	25.00 -26 124	25.00 -24 128	25.00 -22 132	25.00 -20 136	25.00 -18 140	25.00 -16 144	25.00 -14 148	25.00 -12 152	25.00 -10 156
26.00 -30 -35	1.00 -35 -29	26.00 -34 112	26.00 -32 116	26.00 -30 120	26.00 -28 124	26.00 -26 128	26.00 -24 132	26.00 -22 136	26.00 -20 140	26.00 -18 144	26.00 -16 148	26.00 -14 152	26.00 -12 156	26.00 -10 160
27.00 -30 -35	1.00 -35 -29	27.00 -34 116	27.00 -32 120	27.00 -30 124	27.00 -28 128	27.00 -26 132	27.00 -24 136	27.00 -22 140	27.00 -20 144	27.00 -18 148	27.00 -16 152	27.00 -14 156	27.00 -12 160	27.00 -10 164
28.00 -30 -35	1.00 -35 -29	28.00 -34 120	28.00 -32 124	28.00 -30 128	28.00 -28 132	28.00 -26 136	28.00 -24 140	28.00 -22 144	28.00 -20 148	28.00 -18 152	28.00 -16 156	28.00 -14 160	28.00 -12 164	28.00 -10 168
29.00 -30 -35	1.00 -35 -29	29.00 -34 124	29.00 -32 128	29.00 -30 132	29.00 -28 136	29.00 -26 140	29.00 -24 144	29.00 -22 148	29.00 -20 152	29.00 -18 156	29.00 -16 160	29.00 -14 164	29.00 -12 168	29.00 -10 172
30.00 -30 -35	1.00 -35 -29	30.00 -34 128	30.00 -32 132	30.00 -30 136	30.00 -28 140	30.00 -26 144	30.00 -24 148	30.00 -22 152	30.00 -20 156	30.00 -18 160	30.00 -16 164	30.00 -14 168	30.00 -12 172	30.00 -10 176
31.00 -30 -35	1.00 -35 -29	31.00 -34 132	31.00 -32 136	31.00 -30 140	31.00 -28 144	31.00 -26 148	31.00 -24 152	31.00 -22 156	31.00 -20 160	31.00 -18 164	31.00 -16 168	31.00 -14 172	31.00 -12 176	31.00 -10 180
32.00 -30 -35	1.00 -35 -29	32.00 -34 136	32.00 -32 140	32.00 -30 144	32.00 -28 148	32.00 -26 152	32.00 -24 156	32.00 -22 160	32.00 -20 164	32.00 -18 168	32.00 -16 172	32.00 -14 176	32.00 -12 180	32.00 -10 184
33.00 -30 -35	1.00 -35 -29	33.00 -34 140	33.00 -32 144	33.00 -30 148	33.00 -28 152	33.00 -26 156	33.00 -24 160	33.00 -22 164	33.00 -20 168	33.00 -18 172	33.00 -16 176	33.00 -14 180	33.00 -12 184	33.00 -10 188
34.00 -30 -35	1.00 -35 -29	34.00 -34 144	34.00 -32 148	34.00 -30 152	34.00 -28 156	34.00 -26 160	34.00 -24 164	34.00 -22 168	34.00 -20 172	34.00 -18 176	34.00 -16 180	34.00 -14 184	34.00 -12 188	34.00 -10 192
35.00 -30 -35	1.00 -35 -29	35.00 -34 148	35.00 -32 152	35.00 -30 156	35.00 -28 160	35.00 -26 164								

Appendix B

Table of Vertical Cutoff Rigidities for a World Grid as Calculated Utilizing the International Geomagnetic Reference Field for Epoch 1975.0

The table in this appendix summarizes the vertical cutoff rigidity values for a world grid with locations 5 degrees in latitude and 15 degrees in longitude. Each of these values has been determined by the trajectory-tracing technique utilizing the International Geomagnetic Reference Field²⁷ with time derivatives applied so that the coefficients of the model are appropriate for a 1975.0 Epoch.

The format of this table is:

Geographic Location:	The geographic coordinates of each grid point are given with the latitude as positive for the northern hemisphere and negative for the southern hemisphere, and the longitude in degrees East of Greenwich.
L value:	The L value, in Earth radii, calculated using the International Geomagnetic Reference Field ²⁷ (Epoch 1975.0).
P(M):	The main cone cutoff rigidity (in GV) for this location.
P(S):	The Störmer cutoff rigidity (in GV) for this location.
Penumbral width:	The difference between the main cone cutoff rigidity and the Störmer cutoff rigidity (in GV).
PC:	The effective vertical cutoff rigidity (in GV) for this location.

TABLE 31

SUMMARY OF VERTICAL CUTOFF RIGIDITIES FOR THE WORLD GRID
AS CALCULATED USING THE IGRF (EPOCH 1975.0) GEOMAGNETIC FIELD MODEL

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	90.00 0.00	22.289	0.02	0.02	0.00	0.02
WORLD GRID	80.00 15.00	18.103	0.14	0.04	0.00	0.04
WORLD GRID	80.00 30.00	15.455	0.05	0.06	0.00	0.06
WORLD GRID	80.00 45.00	14.141	0.19	0.19	0.00	0.09
WORLD GRID	80.00 60.00	13.174	0.29	0.19	0.00	0.09
WORLD GRID	80.00 75.00	12.550	0.19	0.17	0.00	0.10
WORLD GRID	80.00 90.00	12.145	0.10	0.10	0.00	0.10
WORLD GRID	80.00 105.00	11.415	0.11	0.11	0.00	0.11
WORLD GRID	80.00 120.00	11.062	0.11	0.11	0.00	0.11
WORLD GRID	80.00 135.00	10.336	0.11	0.11	0.00	0.11
WORLD GRID	80.00 150.00	10.548	0.10	0.10	0.00	0.10
WORLD GRID	80.00 165.00	13.535	0.09	0.09	0.00	0.09
WORLD GRID	80.00 180.00	15.449	0.05	0.04	0.00	0.06
WORLD GRID	80.00 195.00	18.747	0.14	0.04	0.00	0.04
WORLD GRID	80.00 210.00	24.802				0.00
WORLD GRID	80.00 225.00	37.212				0.00
WORLD GRID	80.00 240.00	66.384				0.00
WORLD GRID	80.00 255.00	168.951				0.00
WORLD GRID	80.00 270.00	1166.328				0.00
WORLD GRID	80.00 285.00	2272.021				0.00
WORLD GRID	80.00 300.00	222.175				0.00
WORLD GRID	80.00 315.00	81.770				0.00
WORLD GRID	80.00 330.00	44.623				0.00
WORLD GRID	80.00 345.00	29.617				0.00
WORLD GRID	75.00 0.00	12.265	0.10	0.10	0.00	0.10
WORLD GRID	75.00 15.00	10.392	0.14	0.14	0.00	0.14
WORLD GRID	75.00 30.00	9.274	0.19	0.18	0.00	0.18
WORLD GRID	75.00 45.00	8.597	0.20	0.20	0.00	0.20
WORLD GRID	75.00 60.00	8.175	0.25	0.22	0.00	0.23
WORLD GRID	75.00 75.00	7.696	0.25	0.25	0.00	0.25
WORLD GRID	75.00 90.00	7.697	0.25	0.25	0.00	0.25
WORLD GRID	75.00 105.00	7.532	0.26	0.26	0.00	0.26
WORLD GRID	75.00 120.00	7.422	0.27	0.27	0.00	0.27
WORLD GRID	75.00 135.00	7.393	0.28	0.28	0.00	0.28
WORLD GRID	75.00 150.00	7.538	0.26	0.26	0.00	0.26
WORLD GRID	75.00 165.00	7.973	0.24	0.24	0.00	0.24
WORLD GRID	75.00 180.00	8.340	0.20	0.20	0.00	0.20
WORLD GRID	75.00 195.00	10.432	0.14	0.14	0.00	0.14
WORLD GRID	75.00 210.00	13.351	0.09	0.09	0.00	0.09
WORLD GRID	75.00 225.00	18.986	0.03	0.03	0.00	0.03
WORLD GRID	75.00 240.00	31.092				0.00
WORLD GRID	75.00 255.00	60.833				0.00
WORLD GRID	75.00 270.00	127.499				0.00
WORLD GRID	75.00 285.00	134.101				0.00
WORLD GRID	75.00 300.00	67.079				0.00
WORLD GRID	75.00 315.00	35.038				0.00
WORLD GRID	75.00 330.00	21.824	0.02	0.02	0.00	0.02
WORLD GRID	75.00 345.00	15.577	0.07	0.07	0.00	0.07
WORLD GRID	70.00 0.00	7.554	0.26	0.26	0.00	0.26
WORLD GRID	70.00 15.00	6.626	0.34	0.34	0.00	0.34
WORLD GRID	70.00 30.00	6.473	0.41	0.41	0.00	0.41
WORLD GRID	70.00 45.00	5.741	0.49	0.45	0.00	0.47
WORLD GRID	70.00 60.00	5.541	0.49	0.49	0.00	0.49
WORLD GRID	70.00 75.00	5.406	0.56	0.50	0.00	0.51
WORLD GRID	70.00 90.00	5.293	0.52	0.52	0.00	0.52
WORLD GRID	70.00 105.00	5.173	0.55	0.55	0.00	0.55
WORLD GRID	70.00 120.00	5.861	0.65	0.56	0.00	0.59
WORLD GRID	70.00 135.00	4.985	0.60	0.60	0.00	0.60
WORLD GRID	70.00 150.00	5.088	0.66	0.61	0.00	0.62
WORLD GRID	70.00 165.00	5.201	0.56	0.56	0.00	0.56
WORLD GRID	70.00 180.00	5.653	0.47	0.47	0.00	0.47
WORLD GRID	70.00 195.00	6.512	0.39	0.35	0.00	0.36
WORLD GRID	70.00 210.00	8.045	0.23	0.23	0.00	0.23
WORLD GRID	70.00 225.00	10.813	0.13	0.13	0.00	0.13
WORLD GRID	70.00 240.00	15.979	0.06	0.06	0.00	0.06
WORLD GRID	70.00 255.00	25.449				0.00
WORLD GRID	70.00 270.00	37.786				0.00
WORLD GRID	70.00 285.00	38.488				0.00
WORLD GRID	70.00 300.00	26.671				0.00
WORLD GRID	70.00 315.00	17.240	0.05	0.05	0.00	0.05
WORLD GRID	70.00 330.00	12.002	0.11	0.11	0.00	0.11
WORLD GRID	70.00 345.00	9.165	0.18	0.18	0.00	0.18

TABLE 81 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	P(M)	P(S)	PENUMERAL WIDTH	PC
WORLD GRID	65.00 0.00	5.181	0.63	0.57	0.06	0.58
WORLD GRID	65.00 15.00	4.597	0.70	0.71	0.07	0.72
WORLD GRID	65.00 30.00	4.295	0.83	0.78	0.05	0.88
WORLD GRID	65.00 45.00	4.116	0.96	0.88	0.08	0.89
WORLD GRID	65.00 60.00	4.087	1.21	0.91	0.10	0.93
WORLD GRID	65.00 75.00	3.929	1.05	0.93	0.12	0.97
WORLD GRID	65.00 90.00	3.860	1.09	0.90	0.11	1.01
WORLD GRID	65.00 105.00	3.776	1.15	0.99	0.16	1.03
WORLD GRID	65.00 120.00	3.683	1.26	0.99	0.27	1.12
WORLD GRID	65.00 135.00	3.605	1.28	1.15	0.13	1.19
WORLD GRID	65.00 150.00	3.591	1.29	1.16	0.13	1.20
WORLD GRID	65.00 165.00	3.687	1.21	1.10	0.11	1.13
WORLD GRID	65.00 180.00	3.956	1.07	0.91	0.16	0.95
WORLD GRID	65.00 195.00	4.465	0.76	0.73	0.03	0.74
WORLD GRID	65.00 210.00	5.355	0.57	0.50	0.07	0.53
WORLD GRID	65.00 225.00	6.862	0.32	0.32	0.00	0.32
WORLD GRID	65.00 240.00	9.404	0.17	0.17	0.00	0.17
WORLD GRID	65.00 255.00	13.349	0.09	0.09	0.00	0.09
WORLD GRID	65.00 270.00	17.489	0.05	0.05	0.00	0.05
WORLD GRID	65.00 285.00	17.729	0.04	0.04	0.00	0.04
WORLD GRID	65.00 300.00	13.856	0.08	0.08	0.00	0.08
WORLD GRID	65.00 315.00	9.974	0.15	0.16	0.00	0.16
WORLD GRID	65.00 330.00	7.455	0.28	0.28	0.00	0.28
WORLD GRID	65.00 345.00	5.974	0.42	0.42	0.00	0.42
WORLD GRID	60.00 0.00	3.698	1.22	1.03	0.14	1.14
WORLD GRID	60.00 15.00	3.399	1.43	1.28	0.15	1.34
WORLD GRID	60.00 30.00	3.223	1.64	1.36	0.28	1.46
WORLD GRID	60.00 45.00	3.117	1.67	1.45	0.22	1.57
WORLD GRID	60.00 60.00	3.047	1.75	1.46	0.29	1.61
WORLD GRID	60.00 75.00	2.993	1.92	1.53	0.29	1.67
WORLD GRID	60.00 90.00	2.940	1.39	1.60	0.29	1.73
WORLD GRID	60.00 105.00	2.882	1.35	1.72	0.24	1.82
WORLD GRID	60.00 120.00	2.814	2.07	1.81	0.26	1.95
WORLD GRID	60.00 135.00	2.752	2.21	1.91	0.30	2.05
WORLD GRID	60.00 150.00	2.731	2.25	1.84	0.42	2.05
WORLD GRID	60.00 165.00	2.790	2.15	1.72	0.43	1.99
WORLD GRID	60.00 180.00	2.967	1.87	1.68	0.27	1.75
WORLD GRID	60.00 195.00	3.296	1.52	1.27	0.25	1.48
WORLD GRID	60.00 210.00	3.856	1.10	0.99	0.20	1.00
WORLD GRID	60.00 225.00	4.750	0.66	0.64	0.02	0.65
WORLD GRID	60.00 240.00	6.140	0.43	0.39	0.04	0.40
WORLD GRID	60.00 255.00	8.101	0.22	0.22	0.00	0.22
WORLD GRID	60.00 270.00	9.979	0.17	0.15	0.02	0.16
WORLD GRID	60.00 285.00	10.150	0.14	0.14	0.00	0.14
WORLD GRID	60.00 300.00	8.437	0.21	0.21	0.00	0.21
WORLD GRID	60.00 315.00	6.469	0.40	0.37	0.03	0.38
WORLD GRID	60.00 330.00	5.868	0.65	0.56	0.09	0.59
WORLD GRID	60.00 345.00	4.287	0.74	0.82	0.12	0.86
WORLD GRID	55.00 0.00	2.628	2.11	1.88	0.31	1.94
WORLD GRID	55.00 15.00	2.643	2.16	1.99	0.37	2.20
WORLD GRID	55.00 30.00	2.533	2.64	2.34	0.38	2.47
WORLD GRID	55.00 45.00	2.465	2.39	2.30	0.50	2.61
WORLD GRID	55.00 60.00	2.413	2.69	2.37	0.43	2.60
WORLD GRID	55.00 75.00	2.167	3.04	2.16	0.88	2.78
WORLD GRID	55.00 90.00	2.325	3.15	2.56	0.68	2.85
WORLD GRID	55.00 105.00	2.204	3.23	2.65	0.64	2.92
WORLD GRID	55.00 120.00	2.230	3.43	2.76	0.57	3.12
WORLD GRID	55.00 135.00	2.193	3.55	2.91	0.64	3.31
WORLD GRID	55.00 150.00	2.178	3.53	3.03	0.56	3.35
WORLD GRID	55.00 165.00	2.223	3.45	2.77	0.60	3.15
WORLD GRID	55.00 180.00	2.350	3.15	2.70	0.45	2.80
WORLD GRID	55.00 195.00	2.579	2.49	1.96	0.53	2.22
WORLD GRID	55.00 210.00	2.958	1.87	1.61	0.26	1.75
WORLD GRID	55.00 225.00	3.509	1.31	1.21	0.10	1.23
WORLD GRID	55.00 240.00	4.332	0.95	0.76	0.09	0.78
WORLD GRID	55.00 255.00	5.420	0.50	0.50	0.00	0.50
WORLD GRID	55.00 270.00	6.436	0.36	0.36	0.00	0.36
WORLD GRID	55.00 285.00	6.585	0.38	0.35	0.03	0.36
WORLD GRID	55.00 300.00	5.694	0.46	0.46	0.00	0.46
WORLD GRID	55.00 315.00	4.352	0.91	0.73	0.00	0.75
WORLD GRID	55.00 330.00	3.686	1.24	1.04	0.28	1.13
WORLD GRID	55.00 345.00	3.142	1.72	1.41	0.31	1.59

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	SWH	PERI PERI	PENUMBRAL WIDTH	PC
WORLD GRID	50.00 0.00	2.263	3.45	2.99	0.34	3.21
WORLD GRID	50.00 15.00	2.146	3.74	3.23	0.54	3.54
WORLD GRID	50.00 30.00	2.069	4.03	3.45	0.58	3.81
WORLD GRID	50.00 45.00	2.019	4.22	3.60	0.87	3.97
WORLD GRID	50.00 60.00	1.976	4.41	3.75	0.93	4.14
WORLD GRID	50.00 75.00	1.933	4.59	3.87	0.97	4.27
WORLD GRID	50.00 90.00	1.897	4.79	3.97	0.87	4.16
WORLD GRID	50.00 105.00	1.869	4.95	3.71	1.27	4.17
WORLD GRID	50.00 120.00	1.841	5.18	3.44	1.34	4.68
WORLD GRID	50.00 135.00	1.813	5.33	4.19	1.15	4.33
WORLD GRID	50.00 150.00	1.787	5.44	4.33	1.01	4.32
WORLD GRID	50.00 165.00	1.765	5.44	4.00	1.14	4.67
WORLD GRID	50.00 180.00	1.745	4.70	3.86	0.84	4.27
WORLD GRID	50.00 195.00	2.113	3.77	3.09	0.88	3.38
WORLD GRID	50.00 210.00	2.367	3.37	2.31	0.76	2.81
WORLD GRID	50.00 225.00	2.738	2.28	1.65	0.63	2.33
WORLD GRID	50.00 240.00	3.239	1.52	1.37	0.15	1.41
WORLD GRID	50.00 255.00	3.832	1.34	0.33	0.11	0.35
WORLD GRID	50.00 270.00	4.538	0.73	0.72	0.06	0.73
WORLD GRID	50.00 285.00	5.442	0.75	0.68	0.07	0.59
WORLD GRID	50.00 300.00	6.434	1.31	0.57	0.14	0.89
WORLD GRID	50.00 315.00	7.426	1.45	1.25	0.21	1.34
WORLD GRID	50.00 330.00	8.425	2.19	1.75	0.43	1.98
WORLD GRID	50.00 345.00	9.460	2.95	2.42	0.54	2.65
WORLD GRID	45.00 0.00	1.857	4.95	4.31	3.64	4.77
WORLD GRID	45.00 15.00	1.759	5.37	4.64	0.73	4.12
WORLD GRID	45.00 30.00	1.751	5.57	4.92	0.75	5.36
WORLD GRID	45.00 45.00	1.733	5.74	4.33	0.81	5.51
WORLD GRID	45.00 60.00	1.695	6.35	4.74	1.17	5.73
WORLD GRID	45.00 75.00	1.623	6.22	5.33	0.87	5.40
WORLD GRID	45.00 90.00	1.542	6.42	5.74	1.15	5.11
WORLD GRID	45.00 105.00	1.574	6.42	5.51	1.11	5.29
WORLD GRID	45.00 120.00	1.550	6.47	5.31	1.06	5.57
WORLD GRID	45.00 135.00	1.547	7.19	6.13	1.05	5.46
WORLD GRID	45.00 150.00	1.548	7.70	5.75	1.44	5.46
WORLD GRID	45.00 165.00	1.565	6.05	5.46	1.20	5.33
WORLD GRID	45.00 180.00	1.567	5.90	5.14	0.36	5.53
WORLD GRID	45.00 195.00	1.735	5.24	4.33	0.91	4.85
WORLD GRID	45.00 210.00	1.973	4.49	3.40	1.09	4.08
WORLD GRID	45.00 225.00	2.213	3.35	2.79	0.56	3.16
WORLD GRID	45.00 240.00	2.539	2.52	2.22	0.30	2.37
WORLD GRID	45.00 255.00	2.949	1.93	1.54	0.30	1.74
WORLD GRID	45.00 270.00	3.453	1.49	1.23	0.20	1.32
WORLD GRID	45.00 285.00	3.479	1.32	1.12	0.20	1.22
WORLD GRID	45.00 300.00	3.174	1.56	1.43	0.26	1.49
WORLD GRID	45.00 315.00	2.676	2.40	1.91	0.49	2.21
WORLD GRID	45.00 330.00	2.259	3.41	2.44	0.52	3.16
WORLD GRID	45.00 345.00	2.008	4.95	3.33	0.72	4.20
WORLD GRID	40.00 0.00	1.536	6.92	6.33	3.89	6.75
WORLD GRID	40.00 15.00	1.491	7.48	6.19	1.30	7.27
WORLD GRID	40.00 30.00	1.442	7.75	6.00	1.75	7.48
WORLD GRID	40.00 45.00	1.470	8.33	6.14	1.89	7.70
WORLD GRID	40.00 60.00	1.434	8.44	6.39	0.34	5.19
WORLD GRID	40.00 75.00	1.398	8.39	6.51	0.38	5.73
WORLD GRID	40.00 90.00	1.370	9.39	7.79	1.60	5.14
WORLD GRID	40.00 105.00	1.361	9.73	7.71	2.02	5.29
WORLD GRID	40.00 120.00	1.358	10.13	6.90	3.23	4.49
WORLD GRID	40.00 135.00	1.355	10.49	7.63	2.74	5.89
WORLD GRID	40.00 150.00	1.364	10.74	8.75	1.49	5.74
WORLD GRID	40.00 165.00	1.399	9.56	7.34	1.72	5.35
WORLD GRID	40.00 180.00	1.469	8.14	6.46	1.88	7.46
WORLD GRID	40.00 195.00	1.569	6.75	5.45	1.30	5.46
WORLD GRID	40.00 210.00	1.696	5.69	4.67	1.01	5.41
WORLD GRID	40.00 225.00	1.857	4.36	3.71	1.15	4.35
WORLD GRID	40.00 240.00	2.367	3.75	3.28	0.58	3.61
WORLD GRID	40.00 255.00	2.737	2.90	2.51	0.39	2.76
WORLD GRID	40.00 270.00	2.617	2.31	1.90	0.41	2.37
WORLD GRID	40.00 285.00	2.735	2.17	1.75	0.42	1.93
WORLD GRID	40.00 300.00	2.546	2.76	2.19	0.57	2.42
WORLD GRID	40.00 315.00	2.159	3.77	3.13	0.44	3.41
WORLD GRID	40.00 330.00	1.868	5.19	4.10	0.79	4.82
WORLD GRID	40.00 345.00	1.648	6.93	5.27	0.76	5.92

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	LONG.	L VALUE	P(M)	P(S)	PERIMETER WIDTH	PC
WORLD GRID	35.00	0.00	1.320	9.90	8.59	1.31	1.54
WORLD GRID	35.00	15.00	1.290	10.37	8.59	1.78	2.89
WORLD GRID	35.00	30.00	1.293	10.07	8.31	2.36	10.10
WORLD GRID	35.00	45.00	1.295	11.01	8.50	2.51	10.53
WORLD GRID	35.00	60.00	1.270	11.49	9.30	2.19	11.15
WORLD GRID	35.00	75.00	1.233	12.00	9.55	2.45	11.44
WORLD GRID	35.00	90.00	1.209	12.34	9.91	2.43	11.52
WORLD GRID	35.00	105.00	1.206	12.49	10.12	2.37	11.71
WORLD GRID	35.00	120.00	1.211	12.58	10.49	2.09	11.93
WORLD GRID	35.00	135.00	1.216	12.49	10.35	1.54	12.04
WORLD GRID	35.00	150.00	1.229	12.12	10.56	1.56	11.55
WORLD GRID	35.00	165.00	1.264	11.44	9.51	1.93	10.60
WORLD GRID	35.00	180.00	1.324	10.57	7.93	2.64	9.49
WORLD GRID	35.00	195.00	1.403	9.45	7.72	1.73	5.97
WORLD GRID	35.00	210.00	1.494	7.90	6.40	1.50	7.55
WORLD GRID	35.00	225.00	1.602	6.26	5.01	0.65	6.12
WORLD GRID	35.00	240.00	1.748	5.35	4.80	0.55	5.21
WORLD GRID	35.00	255.00	1.921	4.34	3.83	0.51	4.25
WORLD GRID	35.00	270.00	2.123	3.44	2.77	0.67	3.19
WORLD GRID	35.00	285.00	2.234	3.29	2.00	0.69	2.89
WORLD GRID	35.00	300.00	2.122	4.01	3.24	0.77	3.58
WORLD GRID	35.00	315.00	1.851	5.24	4.49	0.75	4.90
WORLD GRID	35.00	330.00	1.503	7.07	5.85	1.22	6.80
WORLD GRID	35.00	345.00	1.407	9.05	7.50	1.55	5.70
WORLD GRID	30.00	0.00	1.186	11.47	10.47	1.40	11.30
WORLD GRID	30.00	15.00	1.164	12.38	10.61	1.49	11.71
WORLD GRID	30.00	30.00	1.160	12.66	10.33	1.73	12.13
WORLD GRID	30.00	45.00	1.164	13.05	11.38	1.67	12.67
WORLD GRID	30.00	60.00	1.146	13.56	12.05	1.51	13.34
WORLD GRID	30.00	75.00	1.113	14.07	14.97	0.80	14.07
WORLD GRID	30.00	90.00	1.093	14.37	14.37	0.80	14.37
WORLD GRID	30.00	105.00	1.094	14.40	14.40	0.80	14.40
WORLD GRID	30.00	120.00	1.105	14.26	14.26	0.80	14.26
WORLD GRID	30.00	135.00	1.115	13.95	13.95	0.80	13.95
WORLD GRID	30.00	150.00	1.131	13.44	13.44	0.80	13.44
WORLD GRID	30.00	165.00	1.163	12.76	11.33	0.93	12.72
WORLD GRID	30.00	180.00	1.215	11.49	10.70	1.29	11.65
WORLD GRID	30.00	195.00	1.278	11.13	9.42	1.77	10.48
WORLD GRID	30.00	210.00	1.344	10.32	7.38	2.94	9.63
WORLD GRID	30.00	225.00	1.416	9.05	7.95	2.83	9.78
WORLD GRID	30.00	240.00	1.508	7.18	6.39	0.79	7.00
WORLD GRID	30.00	255.00	1.631	5.78	5.35	0.43	5.60
WORLD GRID	30.00	270.00	1.781	4.30	4.14	0.76	4.44
WORLD GRID	30.00	285.00	1.885	4.76	3.61	1.15	4.07
WORLD GRID	30.00	300.00	1.824	5.25	4.20	1.05	4.87
WORLD GRID	30.00	315.00	1.610	7.36	5.75	1.61	6.38
WORLD GRID	30.00	330.00	1.376	10.06	8.68	1.38	9.67
WORLD GRID	30.00	345.00	1.243	11.22	9.60	1.62	10.66
WORLD GRID	25.00	0.00	1.092	13.21	12.29	0.92	13.18
WORLD GRID	25.00	15.00	1.073	13.68	12.69	0.99	13.64
WORLD GRID	25.00	30.00	1.067	14.10	14.10	0.80	14.10
WORLD GRID	25.00	45.00	1.070	14.53	14.53	0.80	14.53
WORLD GRID	25.00	60.00	1.056	15.06	15.06	0.80	15.06
WORLD GRID	25.00	75.00	1.028	15.58	15.58	0.80	15.58
WORLD GRID	25.00	90.00	1.011	15.95	15.85	0.80	15.85
WORLD GRID	25.00	105.00	1.014	15.79	15.79	0.80	15.79
WORLD GRID	25.00	120.00	1.028	15.49	15.49	0.80	15.49
WORLD GRID	25.00	135.00	1.041	15.03	15.03	0.80	15.03
WORLD GRID	25.00	150.00	1.059	14.44	14.44	0.80	14.44
WORLD GRID	25.00	165.00	1.088	13.76	13.76	0.80	13.76
WORLD GRID	25.00	180.00	1.132	13.07	13.07	0.80	13.07
WORLD GRID	25.00	195.00	1.182	12.43	12.43	0.80	12.43
WORLD GRID	25.00	210.00	1.229	11.82	11.76	0.86	11.81
WORLD GRID	25.00	225.00	1.278	11.07	10.10	0.97	10.90
WORLD GRID	25.00	240.00	1.348	9.78	8.66	1.12	9.74
WORLD GRID	25.00	255.00	1.424	8.15	7.87	0.28	7.89
WORLD GRID	25.00	270.00	1.534	6.42	5.46	0.96	6.80
WORLD GRID	25.00	285.00	1.636	5.92	4.62	1.30	5.44
WORLD GRID	25.00	300.00	1.609	7.06	5.25	1.81	6.56
WORLD GRID	25.00	315.00	1.434	10.13	7.87	2.26	9.85
WORLD GRID	25.00	330.00	1.230	11.71	10.54	1.17	11.47
WORLD GRID	25.00	345.00	1.134	12.61	11.70	0.91	12.46

TABLE 91 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	P(4)	P(5)	PENUMBRAL WIDTH	PC
WORLD GRID	20.00 0.00	1.033	14.11	14.11	0.00	14.11
WORLD GRID	20.00 15.00	1.036	14.02	14.02	0.00	14.02
WORLD GRID	20.00 30.00	1.037	13.99	13.99	0.00	13.99
WORLD GRID	20.00 45.00	1.037	13.97	13.97	0.00	13.97
WORLD GRID	20.00 60.00	.995	16.12	16.12	0.00	16.12
WORLD GRID	20.00 75.00	.971	16.63	16.63	0.00	16.63
WORLD GRID	20.00 90.00	.957	16.87	16.87	0.00	16.87
WORLD GRID	20.00 105.00	.951	16.75	16.75	0.00	16.75
WORLD GRID	20.00 120.00	.975	16.37	16.37	0.00	16.37
WORLD GRID	20.00 135.00	.998	15.53	15.53	0.00	15.53
WORLD GRID	20.00 150.00	1.009	15.20	15.20	0.00	15.20
WORLD GRID	20.00 165.00	1.034	14.55	14.55	0.00	14.55
WORLD GRID	20.00 180.00	1.070	13.43	13.43	0.00	13.43
WORLD GRID	20.00 195.00	1.108	13.40	13.40	0.00	13.40
WORLD GRID	20.00 210.00	1.141	12.32	12.32	0.00	12.32
WORLD GRID	20.00 225.00	1.175	12.37	12.37	0.00	12.37
WORLD GRID	20.00 240.00	1.218	11.47	11.47	0.00	11.47
WORLD GRID	20.00 255.00	1.277	10.12	9.21	0.91	9.59
WORLD GRID	20.00 270.00	1.364	8.31	7.58	0.63	7.92
WORLD GRID	20.00 285.00	1.454	6.24	5.71	0.53	6.84
WORLD GRID	20.00 300.00	1.452	5.32	6.65	1.17	6.65
WORLD GRID	20.00 315.00	1.303	11.09	10.35	1.24	11.09
WORLD GRID	20.00 330.00	1.143	12.77	12.27	0.50	12.76
WORLD GRID	20.00 345.00	1.065	13.54	13.54	0.00	13.54
WORLD GRID	15.00 0.00	1.023	14.61	14.61	0.00	14.61
WORLD GRID	15.00 15.00	.986	15.14	15.14	0.00	15.14
WORLD GRID	15.00 30.00	.974	15.65	15.65	0.00	15.65
WORLD GRID	15.00 45.00	.969	16.17	16.17	0.00	16.17
WORLD GRID	15.00 60.00	.958	16.74	16.74	0.00	16.74
WORLD GRID	15.00 75.00	.937	17.25	17.25	0.00	17.25
WORLD GRID	15.00 90.00	.926	17.47	17.47	0.00	17.47
WORLD GRID	15.00 105.00	.929	17.34	17.34	0.00	17.34
WORLD GRID	15.00 120.00	.942	16.93	16.93	0.00	16.93
WORLD GRID	15.00 135.00	.920	16.37	16.37	0.00	16.37
WORLD GRID	15.00 150.00	.976	15.76	15.76	0.00	15.76
WORLD GRID	15.00 165.00	.997	15.17	15.17	0.00	15.17
WORLD GRID	15.00 180.00	1.024	14.63	14.63	0.00	14.63
WORLD GRID	15.00 195.00	1.052	14.15	14.15	0.00	14.15
WORLD GRID	15.00 210.00	1.076	13.70	13.70	0.00	13.70
WORLD GRID	15.00 225.00	1.100	13.32	13.26	0.06	13.30
WORLD GRID	15.00 240.00	1.130	12.71	12.28	0.43	12.62
WORLD GRID	15.00 255.00	1.171	11.53	11.09	0.54	11.27
WORLD GRID	15.00 270.00	1.238	9.49	9.49	0.00	9.49
WORLD GRID	15.00 285.00	1.320	10.41	7.53	2.58	8.46
WORLD GRID	15.00 300.00	1.335	11.25	9.63	1.36	10.71
WORLD GRID	15.00 315.00	1.210	12.52	12.52	0.00	12.52
WORLD GRID	15.00 330.00	1.084	13.43	13.43	0.00	13.43
WORLD GRID	15.00 345.00	1.027	14.07	14.07	0.00	14.07
WORLD GRID	10.00 0.00	.993	14.73	14.73	0.00	14.73
WORLD GRID	10.00 15.00	.977	15.26	15.26	0.00	15.26
WORLD GRID	10.00 30.00	.964	15.80	15.80	0.00	15.80
WORLD GRID	10.00 45.00	.955	16.34	16.34	0.00	16.34
WORLD GRID	10.00 60.00	.941	16.94	16.94	0.00	16.94
WORLD GRID	10.00 75.00	.924	17.44	17.44	0.00	17.44
WORLD GRID	10.00 90.00	.915	17.57	17.67	0.00	17.67
WORLD GRID	10.00 105.00	.917	17.56	17.56	0.00	17.56
WORLD GRID	10.00 120.00	.927	17.18	17.16	0.00	17.18
WORLD GRID	10.00 135.00	.942	16.55	16.55	0.00	16.55
WORLD GRID	10.00 150.00	.960	16.10	16.10	0.00	16.10
WORLD GRID	10.00 165.00	.974	15.61	15.61	0.00	15.61
WORLD GRID	10.00 180.00	.993	15.16	15.16	0.00	15.16
WORLD GRID	10.00 195.00	1.017	14.75	14.75	0.00	14.75
WORLD GRID	10.00 210.00	1.029	14.39	14.39	0.00	14.39
WORLD GRID	10.00 225.00	1.046	14.00	14.00	0.00	14.00
WORLD GRID	10.00 240.00	1.068	13.58	13.08	0.42	13.44
WORLD GRID	10.00 255.00	1.097	12.92	12.16	0.66	12.55
WORLD GRID	10.00 270.00	1.149	12.03	11.03	1.00	11.50
WORLD GRID	10.00 285.00	1.222	11.69	10.30	1.39	11.07
WORLD GRID	10.00 300.00	1.248	12.22	11.29	0.93	12.16
WORLD GRID	10.00 315.00	1.145	13.55	13.55	0.00	13.55
WORLD GRID	10.00 330.00	1.058	13.76	13.76	0.00	13.76
WORLD GRID	10.00 345.00	1.012	14.25	14.25	0.00	14.25

TABLE 81 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	PIN	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	5.00 0.00	1.895	14.50	14.50	0.00	14.50
WORLD GRID	5.00 15.00	1.899	14.99	14.99	0.00	14.99
WORLD GRID	5.00 30.00	1.904	15.52	15.52	0.00	15.52
WORLD GRID	5.00 45.00	1.909	16.10	16.10	0.00	16.10
WORLD GRID	5.00 60.00	1.914	16.71	16.71	0.00	16.71
WORLD GRID	5.00 75.00	1.919	17.22	17.22	0.00	17.22
WORLD GRID	5.00 90.00	1.923	17.47	17.47	0.00	17.47
WORLD GRID	5.00 105.00	1.927	17.42	17.42	0.00	17.42
WORLD GRID	5.00 120.00	1.929	17.11	17.11	0.00	17.11
WORLD GRID	5.00 135.00	1.931	16.06	16.06	0.00	16.06
WORLD GRID	5.00 150.00	1.933	16.21	16.21	0.00	16.21
WORLD GRID	5.00 165.00	1.935	15.83	15.83	0.00	15.83
WORLD GRID	5.00 180.00	1.937	15.49	15.49	0.00	15.49
WORLD GRID	5.00 195.00	1.939	15.15	15.15	0.00	15.15
WORLD GRID	5.00 210.00	1.941	14.82	14.82	0.00	14.82
WORLD GRID	5.00 225.00	1.943	14.47	14.47	0.00	14.47
WORLD GRID	5.00 240.00	1.945	14.33	14.33	0.00	14.33
WORLD GRID	5.00 255.00	1.947	13.48	12.63	0.85	13.41
WORLD GRID	5.00 270.00	1.949	12.44	11.98	0.46	12.67
WORLD GRID	5.00 285.00	1.951	12.49	11.52	0.97	12.48
WORLD GRID	5.00 300.00	1.953	12.78	12.78	0.00	12.78
WORLD GRID	5.00 315.00	1.955	13.36	13.36	0.00	13.36
WORLD GRID	5.00 330.00	1.957	13.90	13.90	0.00	13.90
WORLD GRID	5.00 345.00	1.959	14.11	14.11	0.00	14.11
WORLD GRID	0.00 0.00	1.961	13.34	13.34	0.00	13.34
WORLD GRID	0.00 15.00	1.963	14.37	14.37	0.00	14.37
WORLD GRID	0.00 30.00	1.965	14.87	14.87	0.00	14.87
WORLD GRID	0.00 45.00	1.967	15.46	15.46	0.00	15.46
WORLD GRID	0.00 60.00	1.969	16.10	16.10	0.00	16.10
WORLD GRID	0.00 75.00	1.971	16.62	16.62	0.00	16.62
WORLD GRID	0.00 90.00	1.973	16.90	16.90	0.00	16.90
WORLD GRID	0.00 105.00	1.975	16.34	16.34	0.00	16.34
WORLD GRID	0.00 120.00	1.977	16.73	16.73	0.00	16.73
WORLD GRID	0.00 135.00	1.979	16.33	16.33	0.00	16.33
WORLD GRID	0.00 150.00	1.981	16.05	16.05	0.00	16.05
WORLD GRID	0.00 165.00	1.983	15.81	15.81	0.00	15.81
WORLD GRID	0.00 180.00	1.985	15.59	15.59	0.00	15.59
WORLD GRID	0.00 195.00	1.987	15.32	15.32	0.00	15.32
WORLD GRID	0.00 210.00	1.989	15.03	15.03	0.00	15.03
WORLD GRID	0.00 225.00	1.991	14.71	14.71	0.00	14.71
WORLD GRID	0.00 240.00	1.993	14.33	14.33	0.00	14.33
WORLD GRID	0.00 255.00	1.995	13.86	13.86	0.00	13.86
WORLD GRID	0.00 270.00	1.997	13.32	13.32	0.00	13.32
WORLD GRID	0.00 285.00	1.999	12.45	12.35	0.10	12.35
WORLD GRID	0.00 300.00	2.001	12.45	13.05	0.60	13.05
WORLD GRID	0.00 315.00	2.003	13.38	13.38	0.00	13.38
WORLD GRID	0.00 330.00	2.005	13.58	13.58	0.00	13.58
WORLD GRID	0.00 345.00	2.007	13.69	13.69	0.00	13.69
WORLD GRID	-5.00 0.00	1.994	13.13	13.13	0.00	13.13
WORLD GRID	-5.00 15.00	1.996	13.45	13.45	0.00	13.45
WORLD GRID	-5.00 30.00	1.998	13.91	13.91	0.00	13.91
WORLD GRID	-5.00 45.00	2.000	14.50	14.50	0.00	14.50
WORLD GRID	-5.00 60.00	2.002	15.14	15.14	0.00	15.14
WORLD GRID	-5.00 75.00	2.004	15.65	15.65	0.00	15.65
WORLD GRID	-5.00 90.00	2.006	15.97	15.97	0.00	15.97
WORLD GRID	-5.00 105.00	2.008	16.10	16.10	0.00	16.10
WORLD GRID	-5.00 120.00	2.010	16.09	16.09	0.00	16.09
WORLD GRID	-5.00 135.00	2.012	15.77	15.77	0.00	15.77
WORLD GRID	-5.00 150.00	2.014	15.58	15.58	0.00	15.58
WORLD GRID	-5.00 165.00	2.016	15.40	15.40	0.00	15.40
WORLD GRID	-5.00 180.00	2.018	15.42	15.42	0.00	15.42
WORLD GRID	-5.00 195.00	2.020	15.25	15.25	0.00	15.25
WORLD GRID	-5.00 210.00	2.022	15.02	15.02	0.00	15.02
WORLD GRID	-5.00 225.00	2.024	14.74	14.74	0.00	14.74
WORLD GRID	-5.00 240.00	2.026	14.41	14.41	0.00	14.41
WORLD GRID	-5.00 255.00	2.028	14.01	14.01	0.00	14.01
WORLD GRID	-5.00 270.00	2.030	13.53	13.53	0.00	13.53
WORLD GRID	-5.00 285.00	2.032	13.14	13.14	0.00	13.14
WORLD GRID	-5.00 300.00	2.034	13.32	13.32	0.00	13.32
WORLD GRID	-5.00 315.00	2.036	13.13	13.13	0.00	13.13
WORLD GRID	-5.00 330.00	2.038	13.15	13.15	0.00	13.15
WORLD GRID	-5.00 345.00	2.040	13.04	13.04	0.00	13.04

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	P(4)	P(5)	PERIMETRAL WIDTH	PC
WORLD GRID	-10.00 0.00	1.151	12.13	12.02	0.11	12.11
WORLD GRID	-10.00 15.00	1.152	12.31	12.31	0.00	12.31
WORLD GRID	-10.00 30.00	1.138	12.71	12.71	0.00	12.71
WORLD GRID	-10.00 45.00	1.111	11.23	13.29	0.00	13.29
WORLD GRID	-10.00 60.00	1.091	11.49	13.39	0.00	13.50
WORLD GRID	-10.00 75.00	1.080	14.35	14.35	0.00	14.35
WORLD GRID	-10.00 90.00	1.073	14.59	14.59	0.00	14.60
WORLD GRID	-10.00 105.00	1.061	14.40	14.90	0.00	14.90
WORLD GRID	-10.00 120.00	1.053	14.31	14.91	0.00	14.91
WORLD GRID	-10.00 135.00	1.059	14.30	14.40	0.00	14.80
WORLD GRID	-10.00 150.00	1.069	14.75	14.72	0.03	14.74
WORLD GRID	-10.00 165.00	1.058	14.46	14.30	0.06	14.84
WORLD GRID	-10.00 180.00	1.039	14.94	14.94	0.00	14.94
WORLD GRID	-10.00 195.00	1.012	14.90	14.90	0.00	14.90
WORLD GRID	-10.00 210.00	1.007	14.75	14.76	0.00	14.76
WORLD GRID	-10.00 225.00	1.006	14.55	14.55	0.00	14.55
WORLD GRID	-10.00 240.00	1.007	14.29	14.29	0.00	14.29
WORLD GRID	-10.00 255.00	1.011	13.44	13.94	0.00	13.94
WORLD GRID	-10.00 270.00	1.024	13.51	13.51	0.00	13.51
WORLD GRID	-10.00 285.00	1.056	13.10	13.10	0.00	13.10
WORLD GRID	-10.00 300.00	1.052	12.92	12.92	0.00	12.92
WORLD GRID	-10.00 315.00	1.072	12.32	12.32	0.00	12.32
WORLD GRID	-10.00 330.00	1.084	12.65	12.55	0.00	12.55
WORLD GRID	-10.00 345.00	1.124	12.72	11.43	0.79	12.28
WORLD GRID	-15.00 0.00	1.236	11.30	9.58	1.32	10.75
WORLD GRID	-15.00 15.00	1.251	11.03	9.66	1.37	10.91
WORLD GRID	-15.00 30.00	1.243	11.35	10.33	1.32	11.23
WORLD GRID	-15.00 45.00	1.216	11.67	10.57	1.38	11.69
WORLD GRID	-15.00 60.00	1.191	12.39	10.31	1.47	12.18
WORLD GRID	-15.00 75.00	1.183	12.72	11.77	0.95	12.78
WORLD GRID	-15.00 90.00	1.177	13.03	13.00	0.00	13.00
WORLD GRID	-15.00 105.00	1.160	13.47	12.44	0.83	13.25
WORLD GRID	-15.00 120.00	1.147	13.37	12.23	1.14	13.25
WORLD GRID	-15.00 135.00	1.148	13.39	12.26	1.12	13.32
WORLD GRID	-15.00 150.00	1.151	12.51	12.69	0.82	13.48
WORLD GRID	-15.00 165.00	1.138	13.01	13.77	0.84	13.78
WORLD GRID	-15.00 180.00	1.089	14.12	14.82	0.09	14.89
WORLD GRID	-15.00 195.00	1.059	14.24	14.74	0.00	14.24
WORLD GRID	-15.00 210.00	1.044	14.24	14.24	0.00	14.24
WORLD GRID	-15.00 225.00	1.036	14.15	14.15	0.00	14.15
WORLD GRID	-15.00 240.00	1.031	13.97	13.97	0.00	13.97
WORLD GRID	-15.00 255.00	1.030	13.69	13.69	0.00	13.69
WORLD GRID	-15.00 270.00	1.035	13.38	13.38	0.00	13.38
WORLD GRID	-15.00 285.00	1.055	12.57	12.89	0.00	12.89
WORLD GRID	-15.00 300.00	1.080	12.59	12.59	0.00	12.59
WORLD GRID	-15.00 315.00	1.108	12.31	12.31	0.00	12.31
WORLD GRID	-15.00 330.00	1.123	11.84	11.09	0.75	11.76
WORLD GRID	-15.00 345.00	1.187	11.29	10.03	1.26	11.15
WORLD GRID	-20.00 0.00	1.338	9.78	8.10	1.48	9.21
WORLD GRID	-20.00 15.00	1.374	9.64	7.21	2.43	9.86
WORLD GRID	-20.00 30.00	1.372	9.05	8.15	1.70	9.29
WORLD GRID	-20.00 45.00	1.348	10.27	8.43	1.84	9.70
WORLD GRID	-20.00 60.00	1.325	10.58	8.62	1.96	10.21
WORLD GRID	-20.00 75.00	1.322	10.64	7.98	2.66	10.25
WORLD GRID	-20.00 90.00	1.319	10.72	9.01	1.71	10.41
WORLD GRID	-20.00 105.00	1.301	10.99	8.44	2.54	10.65
WORLD GRID	-20.00 120.00	1.281	11.16	8.14	3.02	10.84
WORLD GRID	-20.00 135.00	1.274	11.30	8.95	2.35	10.62
WORLD GRID	-20.00 150.00	1.265	11.69	9.35	2.34	10.74
WORLD GRID	-20.00 165.00	1.231	12.25	10.34	1.41	11.33
WORLD GRID	-20.00 180.00	1.174	12.73	12.78	0.00	12.78
WORLD GRID	-20.00 195.00	1.129	13.24	13.12	0.12	13.19
WORLD GRID	-20.00 210.00	1.107	13.44	13.44	0.00	13.44
WORLD GRID	-20.00 225.00	1.083	13.51	13.51	0.00	13.51
WORLD GRID	-20.00 240.00	1.071	13.46	13.46	0.00	13.46
WORLD GRID	-20.00 255.00	1.062	13.28	13.28	0.00	13.28
WORLD GRID	-20.00 270.00	1.059	12.94	12.94	0.00	12.94
WORLD GRID	-20.00 285.00	1.071	12.53	12.53	0.00	12.53
WORLD GRID	-20.00 300.00	1.092	12.14	12.14	0.00	12.14
WORLD GRID	-20.00 315.00	1.116	11.70	11.21	0.49	11.65
WORLD GRID	-20.00 330.00	1.173	11.05	9.89	1.16	10.73
WORLD GRID	-20.00 345.00	1.263	10.29	8.67	1.62	9.78

TABLE 81 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	P(H)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	-25.00 0.00	1.455	8.52	6.27	2.25	7.55
WORLD GRID	-25.00 15.00	1.518	8.17	6.23	1.96	7.50
WORLD GRID	-25.00 30.00	1.532	8.22	6.32	1.47	7.72
WORLD GRID	-25.00 45.00	1.514	8.36	6.79	1.57	7.88
WORLD GRID	-25.00 60.00	1.498	8.26	6.70	1.56	7.86
WORLD GRID	-25.00 75.00	1.506	7.72	6.27	1.45	7.37
WORLD GRID	-25.00 90.00	1.514	7.33	5.76	1.63	7.08
WORLD GRID	-25.00 105.00	1.497	7.43	6.06	1.43	7.24
WORLD GRID	-25.00 120.00	1.471	7.71	6.73	0.98	7.43
WORLD GRID	-25.00 135.00	1.451	8.02	6.25	1.77	7.71
WORLD GRID	-25.00 150.00	1.426	8.75	6.70	2.05	8.47
WORLD GRID	-25.00 165.00	1.371	9.36	7.24	2.67	9.55
WORLD GRID	-25.00 180.00	1.294	10.47	8.57	2.30	10.22
WORLD GRID	-25.00 195.00	1.220	11.65	10.29	1.36	11.22
WORLD GRID	-25.00 210.00	1.184	12.31	11.22	1.09	12.31
WORLD GRID	-25.00 225.00	1.152	12.63	12.63	0.80	12.63
WORLD GRID	-25.00 240.00	1.128	12.76	12.76	0.00	12.76
WORLD GRID	-25.00 255.00	1.110	12.72	12.72	0.00	12.72
WORLD GRID	-25.00 270.00	1.098	12.47	12.43	0.04	12.46
WORLD GRID	-25.00 285.00	1.100	12.36	11.78	0.28	12.04
WORLD GRID	-25.00 300.00	1.120	11.53	11.06	0.53	11.53
WORLD GRID	-25.00 315.00	1.157	11.02	10.18	0.84	10.74
WORLD GRID	-25.00 330.00	1.235	10.21	8.56	1.35	9.63
WORLD GRID	-25.00 345.00	1.350	9.26	6.34	2.32	8.36
WORLD GRID	-30.00 0.00	1.587	7.29	5.28	1.92	6.36
WORLD GRID	-30.00 15.00	1.681	6.54	5.12	1.42	6.02
WORLD GRID	-30.00 30.00	1.718	6.24	5.35	1.19	5.86
WORLD GRID	-30.00 45.00	1.716	6.02	5.18	0.84	5.79
WORLD GRID	-30.00 60.00	1.720	5.71	4.91	0.80	5.42
WORLD GRID	-30.00 75.00	1.751	5.43	4.60	0.89	5.23
WORLD GRID	-30.00 90.00	1.762	5.40	4.70	0.70	5.18
WORLD GRID	-30.00 105.00	1.775	5.45	4.38	1.07	5.16
WORLD GRID	-30.00 120.00	1.742	5.60	4.44	1.16	5.19
WORLD GRID	-30.00 135.00	1.704	5.79	4.48	1.11	5.39
WORLD GRID	-30.00 150.00	1.658	6.13	4.46	1.17	5.89
WORLD GRID	-30.00 165.00	1.563	6.91	5.42	1.39	6.58
WORLD GRID	-30.00 180.00	1.456	8.03	6.45	1.58	7.39
WORLD GRID	-30.00 195.00	1.363	9.49	8.36	1.41	8.45
WORLD GRID	-30.00 210.00	1.295	10.72	8.20	2.52	9.43
WORLD GRID	-30.00 225.00	1.244	11.42	9.76	1.66	10.64
WORLD GRID	-30.00 240.00	1.205	11.95	11.85	0.80	11.85
WORLD GRID	-30.00 255.00	1.175	12.01	11.96	0.35	12.00
WORLD GRID	-30.00 270.00	1.151	11.59	11.84	0.85	11.88
WORLD GRID	-30.00 285.00	1.144	11.50	11.05	0.45	11.43
WORLD GRID	-30.00 300.00	1.163	10.33	10.31	0.68	10.75
WORLD GRID	-30.00 315.00	1.212	10.29	9.74	1.05	9.83
WORLD GRID	-30.00 330.00	1.309	9.32	7.46	1.66	8.39
WORLD GRID	-30.00 345.00	1.450	8.21	6.44	1.77	7.09
WORLD GRID	-35.00 0.00	1.735	5.66	4.50	1.16	5.24
WORLD GRID	-35.00 15.00	1.864	4.89	3.80	1.09	4.59
WORLD GRID	-35.00 30.00	1.933	4.56	3.89	0.77	4.45
WORLD GRID	-35.00 45.00	1.961	4.54	3.80	0.74	4.31
WORLD GRID	-35.00 60.00	2.001	4.43	3.49	1.08	4.07
WORLD GRID	-35.00 75.00	2.079	4.04	3.26	0.78	3.72
WORLD GRID	-35.00 90.00	2.157	3.54	2.90	0.64	3.35
WORLD GRID	-35.00 105.00	2.176	3.55	2.81	0.74	3.32
WORLD GRID	-35.00 120.00	2.138	3.57	3.01	0.56	3.37
WORLD GRID	-35.00 135.00	2.070	3.49	2.88	1.00	3.65
WORLD GRID	-35.00 150.00	1.969	4.47	3.43	1.04	4.10
WORLD GRID	-35.00 165.00	1.831	5.15	4.04	1.11	4.30
WORLD GRID	-35.00 180.00	1.678	5.88	4.63	1.25	5.65
WORLD GRID	-35.00 195.00	1.545	6.76	5.58	1.10	6.54
WORLD GRID	-35.00 210.00	1.444	7.30	5.48	2.42	7.88
WORLD GRID	-35.00 225.00	1.367	9.72	7.94	1.78	9.11
WORLD GRID	-35.00 240.00	1.388	10.65	8.39	2.26	9.58
WORLD GRID	-35.00 255.00	1.259	11.14	11.87	0.87	11.12
WORLD GRID	-35.00 270.00	1.221	11.19	11.14	0.85	11.16
WORLD GRID	-35.00 285.00	1.205	10.57	10.27	0.60	10.67
WORLD GRID	-35.00 300.00	1.222	10.31	9.44	0.83	9.90
WORLD GRID	-35.00 315.00	1.282	9.58	8.12	1.38	8.72
WORLD GRID	-35.00 330.00	1.399	8.25	6.86	1.39	7.16
WORLD GRID	-35.00 345.00	1.564	7.21	5.79	1.22	6.18

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	P(W)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	-40.00 0.00	1.908	4.43	3.28	0.69	4.29
WORLD GRID	-40.00 15.00	2.878	4.85	3.33	0.72	3.74
WORLD GRID	-40.00 30.00	2.182	3.85	2.59	0.96	3.48
WORLD GRID	-40.00 45.00	2.259	3.58	2.79	0.79	3.21
WORLD GRID	-40.00 60.00	2.362	3.00	2.47	0.53	2.83
WORLD GRID	-40.00 75.00	2.524	2.73	2.17	0.56	2.43
WORLD GRID	-40.00 90.00	2.692	2.36	1.93	0.43	2.08
WORLD GRID	-40.00 105.00	2.774	2.12	1.69	0.23	2.08
WORLD GRID	-40.00 120.00	2.740	2.26	1.53	0.43	2.11
WORLD GRID	-40.00 135.00	2.628	2.43	2.01	0.42	2.21
WORLD GRID	-40.00 150.00	2.438	2.95	2.36	0.79	2.65
WORLD GRID	-40.00 165.00	2.213	3.43	3.03	0.40	3.24
WORLD GRID	-40.00 180.00	1.984	4.18	3.29	0.89	4.11
WORLD GRID	-40.00 195.00	1.792	5.14	4.16	0.98	4.76
WORLD GRID	-40.00 210.00	1.643	5.41	5.01	0.90	5.56
WORLD GRID	-40.00 225.00	1.538	7.03	5.51	1.52	6.65
WORLD GRID	-40.00 240.00	1.441	8.31	6.59	2.32	8.28
WORLD GRID	-40.00 255.00	1.368	10.01	8.16	1.83	9.75
WORLD GRID	-40.00 270.00	1.312	10.34	9.47	0.87	10.18
WORLD GRID	-40.00 285.00	1.285	10.13	9.29	0.84	9.77
WORLD GRID	-40.00 300.00	1.382	9.56	8.41	1.15	8.98
WORLD GRID	-40.00 315.00	1.371	8.65	7.26	1.39	7.61
WORLD GRID	-40.00 330.00	1.506	6.33	5.56	1.32	6.42
WORLD GRID	-40.00 345.00	1.695	5.63	4.67	0.96	5.31
WORLD GRID	-45.00 0.00	2.389	3.97	3.13	0.68	3.46
WORLD GRID	-45.00 15.00	2.304	3.13	2.58	0.61	2.96
WORLD GRID	-45.00 30.00	2.474	2.81	2.21	0.60	2.53
WORLD GRID	-45.00 45.00	2.627	2.62	2.06	0.56	2.38
WORLD GRID	-45.00 60.00	2.834	2.11	1.70	0.41	1.93
WORLD GRID	-45.00 75.00	3.140	1.73	1.41	0.35	1.53
WORLD GRID	-45.00 90.00	3.484	1.35	1.24	0.11	1.28
WORLD GRID	-45.00 105.00	3.784	1.19	1.10	0.89	1.12
WORLD GRID	-45.00 120.00	3.698	1.19	1.01	0.18	1.11
WORLD GRID	-45.00 135.00	3.489	1.35	1.19	0.16	1.25
WORLD GRID	-45.00 150.00	3.153	1.65	1.42	0.23	1.51
WORLD GRID	-45.00 165.00	2.773	2.13	1.92	0.21	2.34
WORLD GRID	-45.00 180.00	2.419	2.77	2.52	0.25	2.72
WORLD GRID	-45.00 195.00	2.131	3.61	3.03	0.61	3.33
WORLD GRID	-45.00 210.00	1.912	4.68	3.49	1.19	4.24
WORLD GRID	-45.00 225.00	1.745	5.35	4.46	0.85	4.93
WORLD GRID	-45.00 240.00	1.615	6.74	4.77	1.47	5.31
WORLD GRID	-45.00 255.00	1.589	8.33	5.97	2.33	7.83
WORLD GRID	-45.00 270.00	1.431	9.21	7.71	1.58	9.40
WORLD GRID	-45.00 285.00	1.392	9.19	7.87	1.32	9.76
WORLD GRID	-45.00 300.00	1.486	8.59	7.21	1.38	7.84
WORLD GRID	-45.00 315.00	1.485	7.26	5.86	1.48	6.91
WORLD GRID	-45.00 330.00	1.636	5.32	4.39	0.97	5.63
WORLD GRID	-45.00 345.00	1.858	4.52	3.67	0.65	4.32
WORLD GRID	-50.00 0.00	2.311	3.07	2.53	0.54	2.87
WORLD GRID	-50.00 15.00	2.588	2.57	2.19	0.38	2.37
WORLD GRID	-50.00 30.00	2.827	2.28	1.72	0.48	1.95
WORLD GRID	-50.00 45.00	3.098	1.75	1.47	0.28	1.60
WORLD GRID	-50.00 60.00	3.461	1.33	1.25	0.14	1.27
WORLD GRID	-50.00 75.00	4.816	1.32	0.98	0.12	0.94
WORLD GRID	-50.00 90.00	4.780	0.87	0.65	0.02	0.68
WORLD GRID	-50.00 105.00	5.244	0.54	0.54	0.00	0.54
WORLD GRID	-50.00 120.00	5.341	0.53	0.53	0.00	0.53
WORLD GRID	-50.00 135.00	4.960	0.62	0.59	0.03	0.60
WORLD GRID	-50.00 150.00	4.312	0.31	0.78	0.13	0.84
WORLD GRID	-50.00 165.00	3.635	1.23	1.12	0.11	1.15
WORLD GRID	-50.00 180.00	3.856	1.74	1.35	0.39	1.63
WORLD GRID	-50.00 195.00	2.689	2.38	1.97	0.41	2.24
WORLD GRID	-50.00 210.00	2.280	3.22	2.51	0.71	2.94
WORLD GRID	-50.00 225.00	2.034	4.14	3.38	0.84	3.76
WORLD GRID	-50.00 240.00	1.844	4.34	3.93	1.01	4.48
WORLD GRID	-50.00 255.00	1.695	5.64	5.85	0.63	5.57
WORLD GRID	-50.00 270.00	1.588	7.25	5.55	1.78	7.82
WORLD GRID	-50.00 285.00	1.534	7.77	6.07	1.78	7.57
WORLD GRID	-50.00 300.00	1.545	7.21	5.69	1.51	6.98
WORLD GRID	-50.00 315.00	1.632	5.92	5.83	0.89	5.68
WORLD GRID	-50.00 330.00	1.799	4.67	4.05	0.62	4.51
WORLD GRID	-50.00 345.00	2.037	3.33	3.24	0.69	3.58

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	PEM	PISA	PENINSULAR WIDTH	PC
WORLD GRID	-55.00 0.00	2.584	2.45	1.53	0.52	2.23
WORLD GRID	-55.00 15.00	2.518	1.90	1.68	0.30	1.79
WORLD GRID	-55.00 30.00	3.260	1.50	1.30	0.26	1.42
WORLD GRID	-55.00 45.00	3.690	1.23	1.37	0.16	1.12
WORLD GRID	-55.00 60.00	4.116	0.90	0.80	0.05	0.67
WORLD GRID	-55.00 75.00	5.249	0.53	0.53	0.00	0.33
WORLD GRID	-55.00 90.00	6.667	0.34	0.34	0.00	0.34
WORLD GRID	-55.00 105.00	8.018	0.23	0.23	0.00	0.23
WORLD GRID	-55.00 120.00	8.446	0.21	0.21	0.00	0.21
WORLD GRID	-55.00 135.00	7.720	0.24	0.25	0.03	0.26
WORLD GRID	-55.00 150.00	6.351	0.41	0.37	0.04	0.34
WORLD GRID	-55.00 165.00	5.027	0.58	0.56	0.04	0.59
WORLD GRID	-55.00 180.00	4.023	1.00	0.67	0.13	0.38
WORLD GRID	-55.00 195.00	3.305	1.42	1.24	0.25	1.38
WORLD GRID	-55.00 210.00	2.794	2.17	1.71	0.46	1.88
WORLD GRID	-55.00 225.00	2.426	2.90	2.37	0.53	1.64
WORLD GRID	-55.00 240.00	2.151	3.60	3.02	0.58	3.38
WORLD GRID	-55.00 255.00	1.944	4.57	3.73	0.84	4.28
WORLD GRID	-55.00 270.00	1.500	5.45	4.51	0.94	4.90
WORLD GRID	-55.00 285.00	1.727	5.16	4.17	0.99	5.19
WORLD GRID	-55.00 300.00	1.734	5.17	4.60	0.57	5.02
WORLD GRID	-55.00 315.00	1.827	4.56	4.08	0.48	4.45
WORLD GRID	-55.00 330.00	2.039	4.41	3.26	0.75	3.67
WORLD GRID	-55.00 345.00	2.278	3.13	2.50	0.69	2.73
WORLD GRID	-60.00 0.00	2.931	1.32	1.68	0.24	1.78
WORLD GRID	-60.00 15.00	3.347	1.44	1.28	0.20	1.32
WORLD GRID	-60.00 30.00	3.835	1.03	1.03	0.00	1.03
WORLD GRID	-60.00 45.00	4.489	0.82	0.74	0.08	0.75
WORLD GRID	-60.00 60.00	5.511	0.55	0.46	0.05	0.49
WORLD GRID	-60.00 75.00	7.228	0.32	0.29	0.03	0.30
WORLD GRID	-60.00 90.00	10.825	0.15	0.15	0.00	0.15
WORLD GRID	-60.00 105.00	13.640	0.04	0.04	0.00	0.04
WORLD GRID	-60.00 120.00	15.832	0.06	0.06	0.00	0.06
WORLD GRID	-60.00 135.00	13.825	0.08	0.08	0.00	0.08
WORLD GRID	-60.00 150.00	10.343	0.14	0.14	0.00	0.14
WORLD GRID	-60.00 165.00	7.482	0.27	0.27	0.00	0.27
WORLD GRID	-60.00 180.00	5.578	0.48	0.48	0.00	0.48
WORLD GRID	-60.00 195.00	4.348	0.66	0.73	0.13	0.79
WORLD GRID	-60.00 210.00	3.529	1.30	1.09	0.21	1.18
WORLD GRID	-60.00 225.00	2.969	1.83	1.57	0.36	1.62
WORLD GRID	-60.00 240.00	2.371	2.48	1.93	0.50	2.23
WORLD GRID	-60.00 255.00	2.265	3.17	2.80	0.37	3.08
WORLD GRID	-60.00 270.00	2.895	4.08	3.23	0.77	3.77
WORLD GRID	-60.00 285.00	1.998	4.29	3.50	0.79	3.95
WORLD GRID	-60.00 300.00	1.396	4.21	3.65	0.56	3.47
WORLD GRID	-60.00 315.00	2.392	3.72	3.22	0.50	3.52
WORLD GRID	-60.00 330.00	2.287	3.05	2.64	0.41	2.68
WORLD GRID	-60.00 345.00	2.573	2.53	2.18	0.35	2.27
WORLD GRID	-65.00 0.00	3.397	1.41	1.23	0.18	1.38
WORLD GRID	-65.00 15.00	3.916	1.11	0.96	0.15	0.96
WORLD GRID	-65.00 30.00	4.582	0.77	0.69	0.08	0.72
WORLD GRID	-65.00 45.00	5.571	0.50	0.50	0.00	0.50
WORLD GRID	-65.00 60.00	7.185	0.30	0.30	0.00	0.30
WORLD GRID	-65.00 75.00	10.151	0.15	0.15	0.00	0.15
WORLD GRID	-65.00 90.00	15.987	0.06	0.06	0.00	0.06
WORLD GRID	-65.00 105.00	26.944				0.00
WORLD GRID	-65.00 120.00	37.884				1.02
WORLD GRID	-65.00 135.00	31.574				0.08
WORLD GRID	-65.00 150.00	19.468	0.03	0.03	0.00	0.03
WORLD GRID	-65.00 165.00	12.844	0.11	0.11	0.00	0.11
WORLD GRID	-65.00 180.00	8.189	0.23	0.23	0.00	0.23
WORLD GRID	-65.00 195.00	5.913	0.47	0.42	0.05	0.43
WORLD GRID	-65.00 210.00	4.591	0.81	0.64	0.13	0.71
WORLD GRID	-65.00 225.00	3.738	1.15	1.00	0.15	1.06
WORLD GRID	-65.00 240.00	3.168	1.62	1.37	0.25	1.51
WORLD GRID	-65.00 255.00	2.768	2.15	1.81	0.34	2.08
WORLD GRID	-65.00 270.00	2.514	2.73	2.04	0.69	2.53
WORLD GRID	-65.00 285.00	2.383	2.32	2.33	0.29	2.71
WORLD GRID	-65.00 300.00	2.368	2.84	2.67	0.27	2.72
WORLD GRID	-65.00 315.00	2.464	2.65	2.46	0.19	2.58
WORLD GRID	-65.00 330.00	2.678	2.34	1.85	0.49	2.18
WORLD GRID	-65.00 345.00	2.984	1.64	1.51	0.13	1.51

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT. LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	-70.00 0.00	4.349	0.31	1.87	0.36	0.89
WORLD GRID	-70.00 15.00	4.342	0.67	0.63	0.66	0.64
WORLD GRID	-70.00 30.00	5.620	0.47	0.47	0.00	0.47
WORLD GRID	-70.00 45.00	7.833	0.31	0.31	0.00	0.31
WORLD GRID	-70.00 60.00	9.478	0.19	0.17	0.02	0.18
WORLD GRID	-70.00 75.00	14.117	0.08	0.08	0.00	0.08
WORLD GRID	-70.00 90.00	25.863				0.00
WORLD GRID	-70.00 105.00	61.722				0.00
WORLD GRID	-70.00 120.00	178.728				0.00
WORLD GRID	-70.00 135.00	123.228				0.00
WORLD GRID	-70.00 150.00	43.302				0.03
WORLD GRID	-70.00 165.00	20.596	0.03	0.03	0.00	0.10
WORLD GRID	-70.00 180.00	12.192	0.10	0.10	0.00	0.22
WORLD GRID	-70.00 195.00	5.264	0.22	0.22	0.00	0.41
WORLD GRID	-70.00 210.00	6.123	0.44	0.43	0.04	0.64
WORLD GRID	-70.00 225.00	4.833	0.56	0.64	0.00	0.36
WORLD GRID	-70.00 240.00	4.108	1.05	0.94	0.12	1.24
WORLD GRID	-70.00 255.00	3.469	1.35	1.19	0.16	1.58
WORLD GRID	-70.00 270.00	3.132	1.67	1.45	0.22	1.75
WORLD GRID	-70.00 285.00	2.954	1.95	1.62	0.33	1.88
WORLD GRID	-70.00 300.00	2.915	1.42	1.56	0.36	1.67
WORLD GRID	-70.00 315.00	3.195	1.75	1.61	0.14	1.39
WORLD GRID	-70.00 330.00	3.223	1.56	1.31	0.25	1.14
WORLD GRID	-70.00 345.00	3.567	1.13	1.05	0.14	
WORLD GRID	-75.00 0.00	5.011	0.59	0.59	0.00	0.59
WORLD GRID	-75.00 15.00	5.823	0.43	0.43	0.00	0.43
WORLD GRID	-75.00 30.00	7.021	0.30	0.30	0.00	0.30
WORLD GRID	-75.00 45.00	8.929	0.19	0.19	0.00	0.19
WORLD GRID	-75.00 60.00	12.233	0.10	0.10	0.00	0.10
WORLD GRID	-75.00 75.00	18.851	0.04	0.04	0.00	0.04
WORLD GRID	-75.00 90.00	35.218				0.00
WORLD GRID	-75.00 105.00	95.612				0.00
WORLD GRID	-75.00 120.00	749.464				0.00
WORLD GRID	-75.00 135.00	479.782				0.00
WORLD GRID	-75.00 150.00	79.817				0.00
WORLD GRID	-75.00 165.00	31.810				0.05
WORLD GRID	-75.00 180.00	17.496	0.05	0.05	0.00	0.12
WORLD GRID	-75.00 195.00	11.382	0.12	0.12	0.00	0.23
WORLD GRID	-75.00 210.00	8.220	0.23	0.23	0.00	0.36
WORLD GRID	-75.00 225.00	6.386	0.36	0.36	0.00	0.54
WORLD GRID	-75.00 240.00	5.247	0.59	0.53	0.00	0.72
WORLD GRID	-75.00 255.00	4.522	0.72	0.72	0.00	0.91
WORLD GRID	-75.00 270.00	4.071	0.97	0.87	0.10	1.02
WORLD GRID	-75.00 285.00	3.829	1.16	0.96	0.20	1.03
WORLD GRID	-75.00 300.00	3.754	1.13	1.00	0.19	1.05
WORLD GRID	-75.00 315.00	3.830	1.15	1.00	0.15	0.88
WORLD GRID	-75.00 330.00	4.068	0.98	0.88	0.00	0.76
WORLD GRID	-75.00 345.00	4.444	0.77	0.75	0.02	
WORLD GRID	-80.00 0.00	6.491	0.39	0.35	0.04	0.37
WORLD GRID	-80.00 15.00	7.448	0.30	0.27	0.03	0.28
WORLD GRID	-80.00 30.00	8.864	0.19	0.19	0.00	0.19
WORLD GRID	-80.00 45.00	11.018	0.13	0.13	0.00	0.13
WORLD GRID	-80.00 60.00	14.484	0.07	0.07	0.00	0.07
WORLD GRID	-80.00 75.00	20.459	0.03	0.03	0.00	0.03
WORLD GRID	-80.00 90.00	31.331				0.00
WORLD GRID	-80.00 105.00	51.845				0.00
WORLD GRID	-80.00 120.00	76.519				0.00
WORLD GRID	-80.00 135.00	90.172				0.00
WORLD GRID	-80.00 150.00	51.410				0.00
WORLD GRID	-80.00 165.00	31.155				0.03
WORLD GRID	-80.00 180.00	20.194	0.03	0.03	0.00	0.08
WORLD GRID	-80.00 195.00	14.218	0.08	0.08	0.00	0.13
WORLD GRID	-80.00 210.00	10.658	0.13	0.13	0.00	0.21
WORLD GRID	-80.00 225.00	8.463	0.21	0.21	0.00	0.30
WORLD GRID	-80.00 240.00	7.058	0.30	0.30	0.00	0.40
WORLD GRID	-80.00 255.00	6.147	0.40	0.40	0.00	0.48
WORLD GRID	-80.00 270.00	5.571	0.49	0.47	0.02	0.55
WORLD GRID	-80.00 285.00	5.247	0.59	0.52	0.07	0.56
WORLD GRID	-80.00 300.00	5.123	0.46	0.56	0.00	0.54
WORLD GRID	-80.00 315.00	5.181	0.45	0.54	0.00	0.49
WORLD GRID	-80.00 330.00	5.415	0.43	0.49	0.00	0.42
WORLD GRID	-80.00 345.00	5.840	0.42	0.42	0.00	